WARREN G. MAGNUSON PARK: DRAINAGE, WETLAND/HABITAT COMPLEX AND SPORTS FIELDS/COURTS PROJECT, PHASE 2

Draft Biological Evaluation

For Threatened and Endangered Species
Under the Endangered Species Act

Assessment for Essential Fish Habitat
For Puget Sound Chinook
Puget Sound Coho
Puget Sound Pink

For Coordination with
National Marine Fisheries Service and
U.S. Fish and Wildlife Service

Prepared by:

Sheldon & Associates, Inc

Prepared for:

SEATTLE PARKS AND RECREATION

January 17, 2006

WARREN G. MAGNUSON PARK: DRAINAGE, WETLAND/HABITAT COMPLEX AND SPORTS FIELDS/COURTS PROJECT, PHASE 2

DRAFT BIOLOGICAL EVALUATION

Prepared by:

Kevin O'Brien, Wildlife Biologist
Jenna Scholz, Aquatic Ecologist
Sheldon & Associates, Inc.
5031 University Way NE #204
Seattle, WA 98105

Prepared for:

Seattle Parks and Recreation
100 Dexter Ave. N.
Seattle, WA 98109

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EXECUTIVE SUMMARY

The City of Seattle Department of Parks and Recreation has undertaken a process to design and implement Phase 2 development of new sports fields, integrated site drainage facilities, and a wetland/habitat complex at Warren G. Magnuson Park. As part of this Phase 2 process, some existing buildings and impervious surfaces will be removed, new athletic fields with subsurface drainage facilities will be constructed, and a wetland/habitat complex will be installed. Approximately 12.4 acres of paved roads and parking areas will be removed and no new roads or paved parking areas will be created. Approximately 1.8 acres of new paved trails will be created.

The Phase 2 proposed action involves: constructing 4 athletic fields and the sub-grade for 1 future field on the western portion of the project area; re-alignment of the cross-park trail and creation of new walking trails between the fields and habitat areas; and improvement and creation of habitats within the project area by enhancing upland wetland habitats by planting native trees and shrubs, changing the hydroperiods of some wetlands to increase depth and/or duration of saturation/inundation, and creating new wetland areas.

The proposed project is not likely to result in any substantial direct or indirect impacts to bald eagles. The action area and project vicinity are not considered breeding habitat for bald eagles. Any direct impacts to foraging or wintering bald eagles are likely to be minor and temporary, and would involve avoidance of the project site during construction periods generating loud noise. The project-related loss of some trees is unlikely to limit the availability of perching sites for foraging, due to the low quality of these trees as perch trees. No other impacts to bald eagles are anticipated as a result of this project. Some benefit to bald eagles, in the form of increased perching or roosting trees, could potentially occur as wetland and upland habitat matures. Due to the minor and temporary nature of any disturbance to bald eagles, this project **may affect, but is not likely to adversely affect** this species.

Potential adverse effects of construction and runoff from new playing fields on fish species were analyzed. No adverse impacts to fish habitat resulting from the construction of the new fields were identified, as no part of this project includes in-water work it will all be conducted above the OHWM of Lake Washington and its drainages. In addition, no water quality impacts that could indirectly affect fish including bull trout and Chinook salmon were identified. Treatment of runoff from some existing impervious surfaces will provide an improvement over existing conditions as storm-water from some existing roads and parking lots within the Park is not currently treated before being discharged to Lake Washington. In addition, no impacts on water quality associated with runoff from artificial fields are anticipated. Studies conducted in the region have concluded that artificial turf fields are constructed of inert materials and have not been associated with impacts to water quality. Finally, although it is anticipated that there will be an increase in the amount of vehicular traffic volumes at the park, there is a planned significant decrease in the amount of paved surfaces over existing conditions. Therefore, increases in traffic volume are not anticipated to result in adverse water quality impacts in Lake Washington. Furthermore the proposed stormwater treatment, as well as the conveyance of water through over 1,000 feet of vegetated wetlands will improve water quality before it is discharged to the Lake. Because of these factors, this project is likely to have **no effect** on bull trout or Chinook salmon.

All other listed or candidate species under the Endangered Species Act are not found on the project site or within the project action area. Therefore, this project will have **no effect** on these listed or candidate species.

An assessment for Essential Fish Habitat (EFH) is also included in this document, as required under the Magnuson-Stevens Fishery Conservation and Management Act. The Pacific Fisheries Management Council (PFMC) has designated EFH for the Pacific salmon fishery, for federally managed groundfish, and for coastal pelagic fisheries. For this project, only species of the Pacific salmon fishery could potentially be affected, as Lake Washington is a freshwater system.

The project will result in no temporary increase in sediment in Lake Washington during construction. In addition, no project-related water quality impacts are expected in Lake Washington. No permanent adverse effects on EFH for Pacific salmon will occur as a result of this project. Therefore, the project will have **no effect** on EFH for Pacific salmon.

1.0 INTRODUCTION

The City of Seattle Parks and Recreation Department (Seattle DPD) has undertaken a process to design improvements in Magnuson Park as part of the Master Plan for the future development of Magnuson Park (Seattle Parks and Recreation 2001). Magnuson Park has undergone the Master Planning process several times in the decades since the Park was acquired by Seattle Parks and Recreation from the Federal government.

The 2001 Master Plan identified creation of 11 lighted synthetic turf athletic fields, a natural grass sports meadow and improving the habitat conditions, including wetlands, within the Park through an extensive public process. Modifications to the proposed design parameters within the Master Plan were made through various political and environmental review processes during which the total number of fields in the master plan were reduced. The final master plan, as approved by the City Council on June 14th 2004 by Council Bill # 114827 contained the sports meadow and up to 9 athletic fields (up to 7 of which may be lighted).

The Master Plan identified multiple Phases of work to complete all elements of the Plan. Phase 1 was the natural grass sports meadow which was constructed in 2004-05, completed in fall of '05 to be opened to use in 06. Phase 2 of the Master Plan (that is the subject of this biological evaluation) is designed to be a "stand alone" addition to the park (in terms of park and environmental function) should no future phases of the park master plan be pursued. The proposed action under the Phase II development will occur on an approximately 95-acre portion of Magnuson Park. The proposed action involves creating athletic fields and associated infrastructure such as stormwater conveyance facilities, and creating and enhancing wetland and upland habitats.

Phase 2 is currently funded including significant funds from the Seattle Pro-Parks Levy with some additional funding sources. At this point in time, no future public funding for subsequent phases of the Park Master Plan have been identified. Therefore, the actions and compensation proposed within this report are considered as one separate and complete project because there is no public funding identified for any future phases.

2.0 PURPOSE OF EVALUATION

The purpose of this biological evaluation is to assess the potential impacts of the proposed project to listed and proposed species in accordance with Section 7(c) of the Endangered Species Act (ESA) of 1973 (NMFS 1996). Federally listed threatened and endangered species are those plant and animal species formally listed by United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under authority of the Endangered Species Act of 1973, as amended. An endangered species is defined as one in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as one likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Candidate species are those being considered for listing as threatened or endangered by the USFWS. The evaluation is designed to facilitate coordination between the U.S. Army Corps of Engineers (Corps), and NMFS and the USFWS.

The goal of this biological evaluation is to assess the effects of the proposed action on the listed species and their critical habitat, and to arrive at a determination of effect (NMFS 1998). The objectives of this study are to assess and evaluate:

- the level of use of the project area and of the action area by the listed species,
- the long-term effects of the project on listed species and their habitat, and
- the short-term impacts of project construction on listed species.

2.1 List of Species

Species lists for this project were obtained from the USFWS website and the NMFS website (NMFS 2005) on October 20, 2005. A habitat and species map for the project site, dated September 12, 2005, was obtained from Washington Department of Fish and Wildlife (WDFW 2004a), and information on rare plants or high quality native ecosystems, dated September 21, 2005, was obtained from the Washington State Department of Natural Resources (WDNR 2005). Federally listed species that may occur within King County are provided in Table 1. Species of concern at both the federal and state level are listed in Appendix A.

2.2 Designated Critical Habitat

Critical habitat is defined in section 3(5)(A) of the ESA as "(i) the specific areas within the geographical area occupied by the species…on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species…upon a determination by the Secretary that such areas are essential for the conservation of the species." The term "conservation", as defined in section 3(3) of the ESA, means " …to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary"; i.e. the species is recovered and has been removed from the list

Table 1: Federally Listed/Candidate Species that May Occur in King County, in the Vicinity of Magnuson Park.

Common Name	Scientific Name	Federal Status	WA State Status	Regulatory Agency
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Threatened	USFWS
Bull Trout, Coastal/Puget Sound ESU*	*Salvelinus confluentus*	Threatened	Candidate	USFWS
Chinook Salmon, Puget Sound ESU*	*Oncorhynchus tshawytsha*	Threatened	Endangered	NMFS
Coho Salmon, Puget Sound ESU*	*Oncorhynchus kisutch*	Candidate	Candidate	NMFS
Bird Species (other than bald eagles)				
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	Threatened	USFWS
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	Endangered	USFWS
Yellow-billed Cuckoo	*Coccyzus americanus*	Candidate	Candidate	USFWS
Carnivorous Mammals				
Canada Lynx	*Lynx canadensis*	Threatened	Threatened	USFWS
Gray Wolf	*Canis lupus*	Endangered	Endangered	USFWS
Grizzly Bear	*Ursus arctos*	Threatened	Endangered	USFWS
Pacific Fisher	*Martes pennanti pacifica*	Candidate	Endangered	USFWS
Marine Species				
Humpback Whale	*Megaptera novaengliae*	Endangered	Endangered	NMFS
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	Endangered	NMFS
Southern Resident Killer Whale DPS**	*Ocrinas orca*	Endangered	Endangered	NMFS
Steller Sea Lion	*Eumetopias jubatus*	Threatened	Threatened	NMFS
Plants				
Golden Paintbrush	*Castilleja levisecta*	Threatened	Endangered	USFWS
Marsh Sandwort	*Arenaria paludicola*	Endangered	Possibly extinct or extirpated	USFWS

*ESU: Evolutionarily Significant Unit **DPS: Distinct Population Segment

of threatened and endangered species. Section 3 also states that the entire range of a species will not usually fall within critical habitat. On January 15, 1992, critical habitat was designated for the northern spotted owl under Section 7 of the ESA, and in May of 1996 critical habitat was designated for the marbled murrelet. Critical habitat for the coastal/Puget Sound bull trout population segment was proposed on June 25, 2004.

2.3 Field Review

Field reviews of the project site were conducted during the spring of 2005 by fisheries and wildlife biologists from Sheldon & Associates, and another such field review was conducted on October 5, 2005. In addition, wetland ecologists and wildlife biologist staff of Sheldon & Associates spent 5 weeks on site conducting detailed wetland delineation in spring, 2005. Site visits determined the likely occurrence of listed and candidate species in the area, assessed habitat, and evaluated the potential impacts of the project. Sheldon & Associates biologists also evaluated current habitat and potential fish access to the project area.

Some information for this report was obtained, in part, from the Sand Point Magnuson Park Drainage, Wetland/Habitat Complex and Sports Fields/Courts Project Final Environmental Impact Statement (FEIS), the technical appendices to that document, and the Final Supplemental Environmental Impact Statement (FSEIS) for this project (Seattle Parks and Recreation 2001). Sheldon & Associates contributed to the wetlands and wildlife sections for all of the above documents. Additional information includes documents prepared from local fish and wildlife biologists, applicable literature, WDFW Priority Habitats and Species Database, USFWS, NMFS, and the Washington State Department of Natural Resources (WDNR).

WDNR has no records for rare plants or high quality ecosystems in the vicinity of the project. WDFW indicated that the waters of Lake Washington bordering the project site are known for priority anadromous and resident fish presence.

The project area is not located within any wetlands listed in the National Wetlands Inventory, although there are wetlands occurring on the site. A bald eagle breeding area is identified greater than 0.5 miles southeast of the project area along the shores of Lake Washington.

3.0 SETTING

3.1 Project Area

Magnuson Park is located in the City of Seattle, King County, Washington (Figure 1). It is located in the northeast corner of Seattle on a peninsula surrounded by Lake Washington (Figure 2). The Park lies in Section 2, Range 4 East, and Township 25 North. Magnuson Park is bordered on the west by Sandpoint Way NE, along the south roughly by NE 65th Street (a portion of the Park lies

Figure 1. Vicinity Map of Magnuson Park in Seattle, Washington.

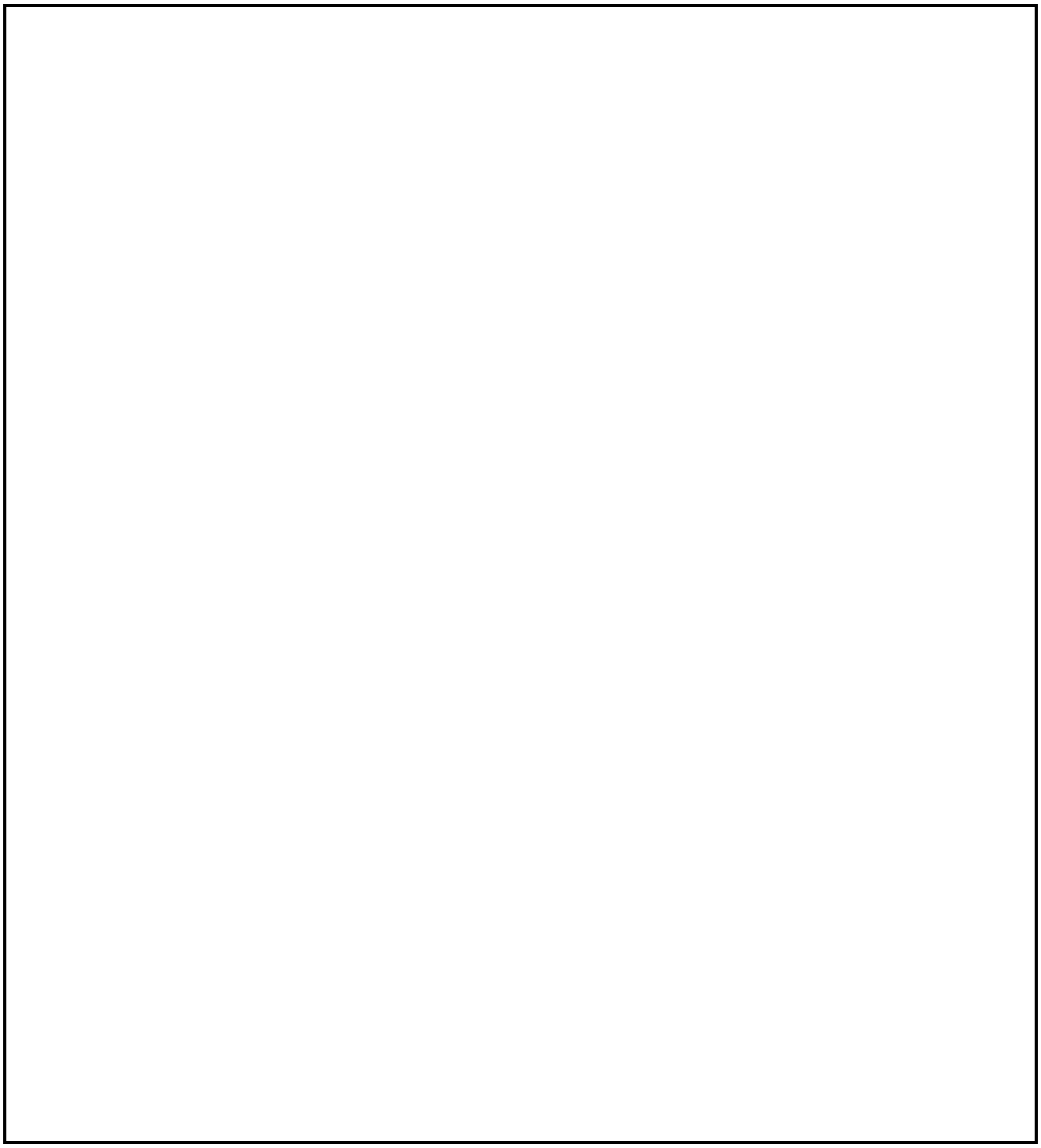

Figure 2. Aerial photograph of Magnuson Park in Seattle, Washington.

south of NE 65th if it was extended to the lakeshore), on the east side by Lake Washington, and to the north by the National Oceanic and Atmospheric Administration (NOAA) facilities. Magnuson Park is a 350-acre park managed by the City of Seattle that contains historic Naval Air Station structures, athletic fields, a dog off-leash area, playground, parking lots, walkways, stormwater conveyance facilities, and open habitat areas. The City of Seattle and various non-profit groups use several historic buildings that remain from the Naval Air Station.

The general topography of the project site is characterized by relatively flat terrain that had historically been filled, graded, and paved during its use as both a civilian and a naval airfield. Highly compacted soils on site, combined with the lack of significant slope, result in winter ponding in minor depressions. Wetland conditions, ranging from wet meadows and seasonal marshes to shrub and forested wetlands, are present on much of the site. Upland areas are present throughout the site as well, and generally consist of mowed grasslands, meadows, tree and shrub thickets, dense thickets of non-native species such as Himalayan blackberry, and deciduous forest habitat at Promontory Point. Many of the tree and shrub species are non-native (e.g. Lombardy poplar, Scot's broom, etc.). Habitat complexity and values within the project area are variable, but may be generally characterized as disturbed and in early vegetative successional stages, with the exception of the Promontory Point habitat. No streams occur in the park.

Current land use consists of sports and recreation activities, nature-oriented activities such as birding, and use of the park for arts, cultural, and education functions. Pedestrian trails and paved roads wind through the park, and several parking lots are present. A boat launch site and off-leash dog area also occurs in the park. Most of the land in the vicinity of the project has been disturbed from its natural state by a combination of roads, sewer lines and storm drains, residential homes, and general urban development.

3.2 Action Area

The action area is defined as the area that may provide habitat for the species in question, and which could be affected by the project both during and after construction. The action area typically includes area beyond the immediate project footprint. Effects include direct, indirect, interrelated and interdependent, and beneficial effects from the proposed project.

The action area for terrestrial species consists of a 0.5-mile radius circle around the limits of the project construction (Figure 3). The 0.5-mile radius delimitation for the action area is typical for projects involving no pile driving or other highly significant noise.

The action area for salmonids will extend water ward of the ordinary high water mark (OHWM) of the shore of Lake Washington, due to the discharge of water collected from the project site into the lake. The action area for salmonids will be subsumed within the action area for terrestrial species. This shoreline habitat may offer refuge and rearing habitat for young Chinook salmon and bull trout, and adult Chinook and Coho salmon adults have historically occurred within the shoreline habitat included in the action area. No streams or other waters accessible to salmon are located in the project area.

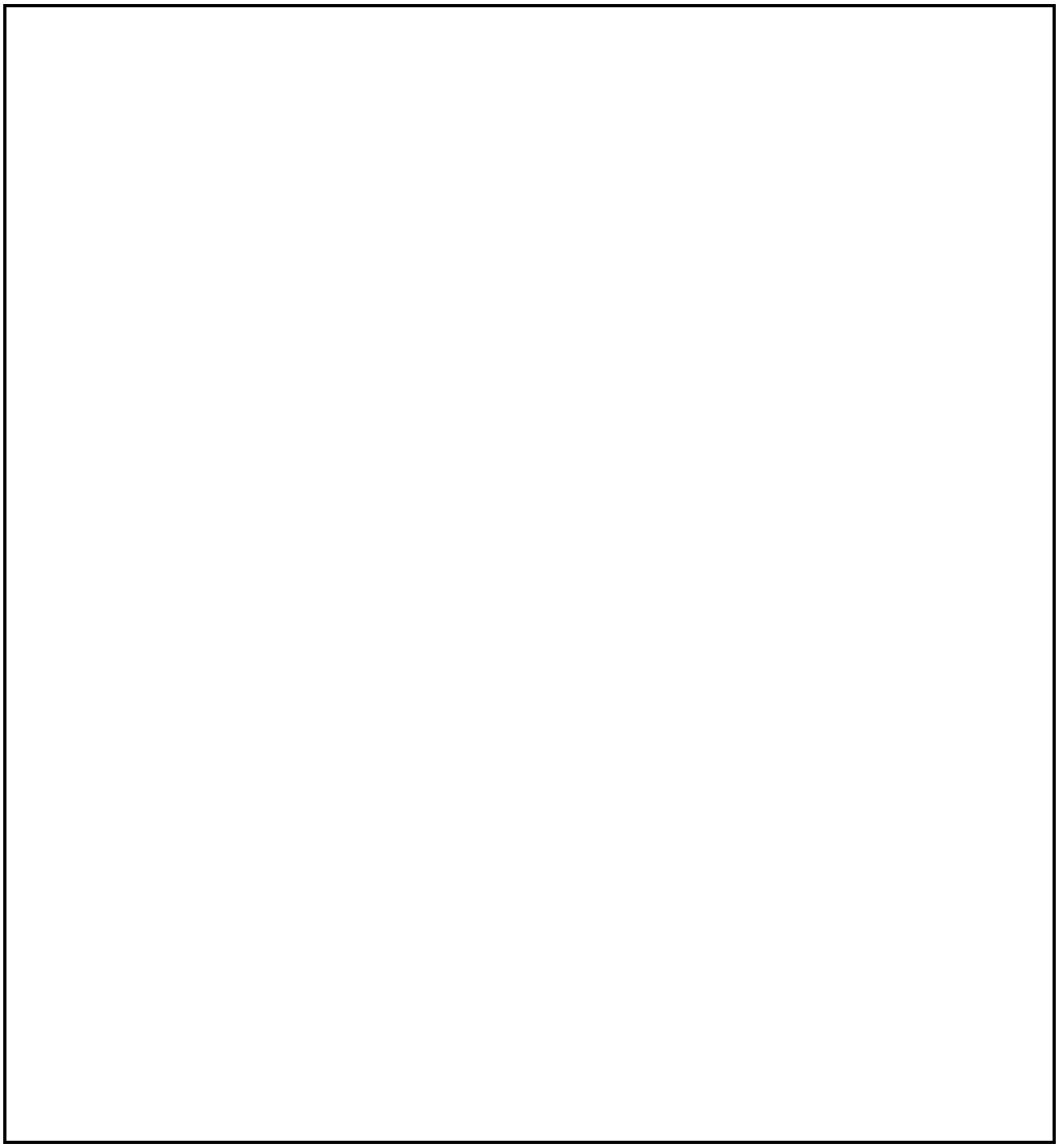

Figure 3. Action area for Magnuson Park Phase 2.

4.0 PROJECT DESCRIPTION

The following project description provides information on the proposed action of Phase 2 development in Magnuson Park. Additional information on the project is provided in the Wetland Compensation Plan prepared for this project (Sheldon & Associates 2006). Figure 4 illustrates the proposed action in Magnuson Park. Appendix B contains construction drawings of the proposed action. The Phase 2 proposed action involves: constructing 4 athletic fields and the sub-grade for 1 future field on the western portion of the project area; re-align the cross-park trail and create new walking trails between the fields and habitat areas; and to improve habitats within the project area by enhancing upland habitats and wetland habitats by planting native trees and shrubs, changing the hydroperiods of some wetlands to increase depth and/or duration of saturation/inundation, and creating new wetland areas. See Figure 4 for the limits of the Phase 2 project area within Magnuson Park and the layout of the fields described below.

Athletic Fields

It is proposed to construct 4 athletic fields and the sub-grade for one additional field for this project. All the fields for this project will be constructed by grading to raise the fields above existing grades in order to provide positive drainage for the fields and to provide water to the down-gradient wetland habitats. The area of the playing surface of the field (including 'run-out' zones) and also an estimate of the area of the field footprint (i.e., the extent of filling necessary to create the sub-base on which the playing surface is laid out and associated adjacent improvements) is used.

Field #5: Rugby

This field will be grass turf, with the possibility of a synthetic turf upgrade dependant on budget availability. The field dimensions are 455 feet by 255 feet including run-outs for the playing surface. The total footprint of approximately 503 feet by 282 feet includes the limits of grading, adjacent trails, etc. The field will be lit for evening and night use (per the lighting description at the end of this section). Parking for this field will be provided in the existing paved parking area to the northwest, which currently serves the Jr. League playground, and Off-leash area. The field will be irrigated if natural grass, but non-irrigated if synthetic turf. The field will be constructed with an under-ground drainage system that will collect surface water (from storm events or from irrigation) and discharge it at mid field along the field's southern edge through a single outfall. If natural turf it will be managed for grass quality by utilizing Best Management Practices for application of fertilizer, herbicides, pesticides, if synthetic surface, no such practices will be used for maintenance.

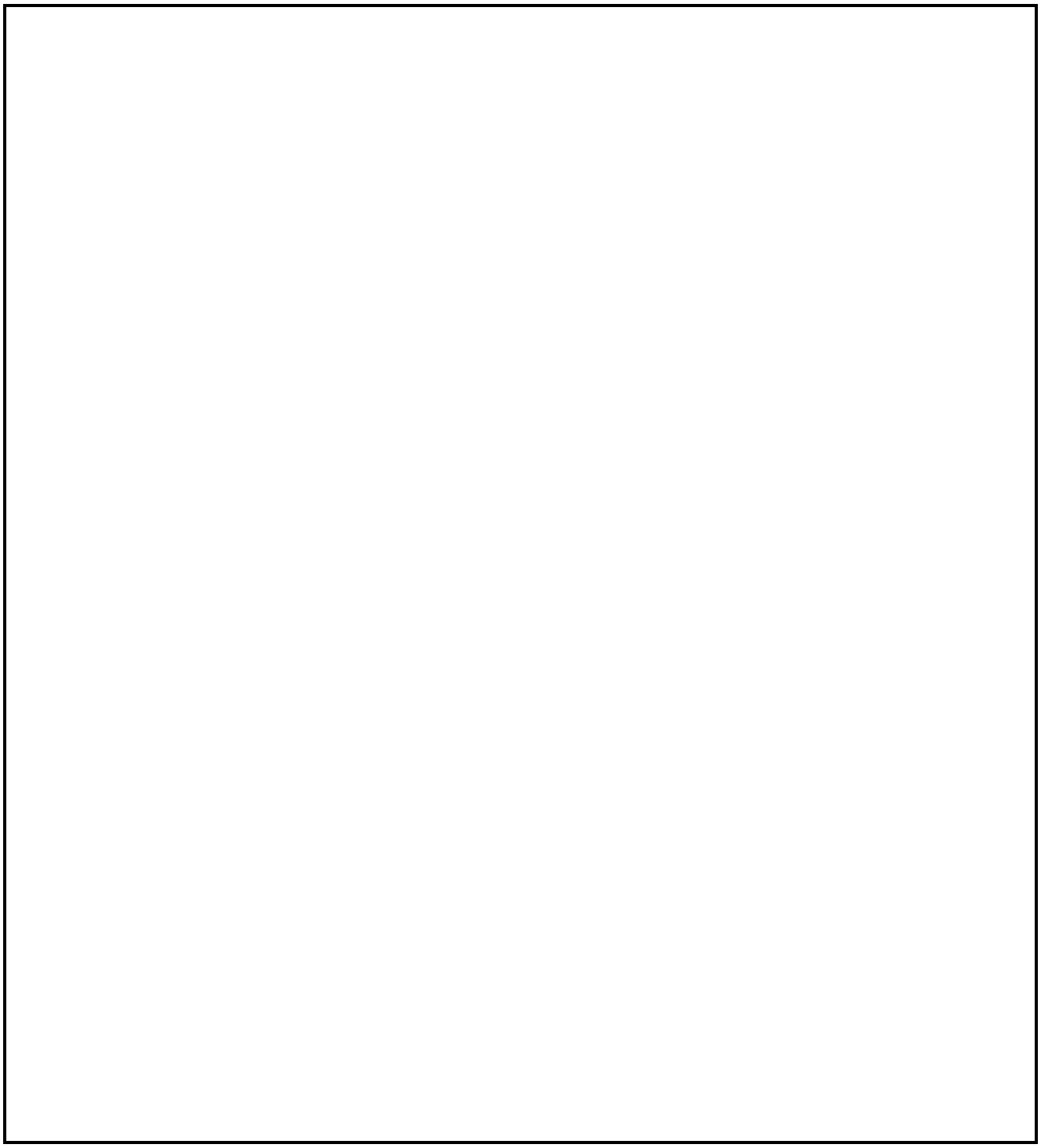

Figure 4. Phase 2 configuration within Magnuson Park.

Field #1: Soccer
This field will be synthetic turf, 385 feet by 255 feet including run-outs for the playing surface with a total footprint of approximately 419 feet by 340 feet including limits of grading, adjacent trails, etc. The field will be lit for evening and night use (per the lighting description at the end of this section). Parking for this field will be provided in the existing paved parking area to the northwest. The field will not be irrigated. The field will be constructed with an under-ground drainage system that will collect surface water (from storm events or from irrigation) and discharge it at the southeast corner of the field with through a single outfall. .

Field #3: Soccer (Field subgrade)
This phase includes the establishment of subgrade of field # 3. Construction of the field itself is not fully funded and may or may not be included in this phase dependant on additional fundraising. The sub grade will have a footprint of approximately 400 by 300 feet including limits of grading, adjacent trails, etc. If completed the playing surface will be grass or artificial turf, turf, 385 feet by 255 feet including run-outs. The field will be lit for evening and night use (per the lighting description at the end of this section). Parking for this field will be provided in the existing paved parking area to the northwest. The field will be irrigated if natural grass, but non-irrigated if synthetic turf. The field subgrade will sheet flow to the SW, similar to existing conditions and sheet flow patterns. If constructed, the field will have an under-ground drainage system that will collect surface water (from storm events or from irrigation) and discharge it at along the north edge of the field through a single outfall.

Field 6: Fast-pitch Baseball
This field will have a grass turf outfield with a synthetic turf infield (the outfield may be upgraded to a synthetic turf dependent on budget availability). Playing surface areas measure 350 feet along the baselines with an outfield arc of 385 feet, with an approximate footprint of approximately 444 feet by 400 feet including limits of grading, adjacent trails, etc. The field will not be lit. Parking for this field will be provided in the existing paved parking area to the south, north of 65th Street. Natural grass portions of the field will be irrigated, but non-irrigated if synthetic turf. The field will be constructed with an under-ground drainage system that will collect surface water (from storm events or from irrigation) and discharge it at along the east field edge through a single outfall.

Field 9: Little League/Softball
This field will have a grass turf outfield with a synthetic turf infield (the outfield may be upgraded to a synthetic turf dependent on budget availability). Playing surface areas measure 250 feet along the base lines with an outfield arc of 235 feet, with an approximate footprint of approximately 327 feet by 292 feet including limits of grading, adjacent trails, etc. The field will be lit for evening and night use (per the lighting description at the end of this section). Parking for this field will be provided in the existing paved parking area to the south, north of 65th Street. Natural grass portions of the field will be irrigated, but non-irrigated if synthetic turf. The field will be constructed with an under-ground drainage system that will collect surface water and discharge it at along the east field edge through a single outfall.

Field Lighting
Those fields identified to be lighted for evening and night use could be lighted from dusk until 10:00 PM, Monday through Saturday, with no lighting on Sundays. Actual light use will be less

than these windows, based on time of year and scheduling considerations. The fields are lighted only when reserved for athletic events. Lighting technology is intended to be either shielded conventional lighting or full cut-off lighting based on field lighting requirements and a balanced approach to minimizing spill light, glare and sky glow.

Trails

In existing conditions, Magnuson Park has an intricate network of formal and informal walking trails throughout the Park. Historic use as a Naval Air Station has left the site with remnant features (e.g., portions of taxiways and runways, perimeter roads, etc.) that are used as *de facto* trails. In addition, decades of public use has resulted in a myriad network of informal dirt paths throughout the interior portions of the Park. The Park is used extensively by the public; it is extremely rare to be on this site and not witness public use of the formal and informal trail system.

The proposed action under Phase 2, will formalize a perimeter trail linking north to south across the interior portion of the site. The trail will be handicap accessible and will provide for overlooks into the interior of the improved habitat zones. Overlooks will be provided on the west side of the habitat zone on a large created berm, and to the Promontory Point wetlands and marshes to the north, with a trail and dead-end node entering from the north.

The proposed trail system will also include access to the range of habitat types on the site for educational purposes, but seeks to provide that access along the periphery of the habitat zones. Trails will provide access to various wetland types including ready access to surface water for sampling opportunities. At the same time, the trail system will be designed to limit access to interior all portions the habitat zones. Based on input from the public and wetland scientists, there are no trails proposed within the interior habitat zones creating a "sacred zone" in the heart of the habitat zone that is free of human activity, eliminating many of the current informal trails that currently crisscross this area. A trail will be created between the Promontory Point wetlands and 65th Street in the southeast corner of the project area to allow pedestrian access through various habitat types and to remove pedestrian movement from 65th Street.

4.1 Site Preparation

Preparation of the site will start by surveying and staking the limits of construction. Areas of protection, project control points and alignments, and phasing boundaries will all be indicated. Limits of clearing will be marked, and protective fencing installed around large trees. Temporary sediment and erosion control measures will be installed.

4.2 Temporary Erosion and Sediment Control (TESC)

Temporary Erosion and Sediment Control (TESC) measures will include Best Management Practices (BMPs) for collecting, treating, and controlling stormwater runoff to prevent untreated stormwater from leaving the construction site. TESC measures will be located throughout the construction site as shown in the TESC plans and will be installed in accordance with City of Seattle and industry standards and specifications. Measures will include construction exits, ground stabilization, sediment barriers, filter fabric fence, catch basin inserts, interceptor swales, rock check dams, straw bales, mulch, and sediment traps and temporary sediment ponds. Construction

staging areas will be located on existing paved surfaces. TESC measures will remain in place until the permanent site improvements and plantings are stabilized so that untreated stormwater runoff will not leave the construction site.

4.3 Grading, Excavation, and Road Surfacing

Site grading will change the existing site from a relatively flat site to an undulating site that will include small mounds, plateaus, valleys, and ponds. Soil from the easterly portion of the site, where the significant ponds and large wetlands will be located, will be excavated and reused as embankment for the athletic fields at the westerly and northerly portions of the site. Wide shallow swales will be located around the new athletic fields (plateaus) and will convey surface water and subsurface water runoff east toward the large wetlands.

Approximately 43 acres of site will be graded for the new fields and wetlands. Excavation depths will vary between 0 and 14 feet. Embankment heights will vary between 0 and 14.5 feet.

Approximately 12.4 acres of paved roads and parking areas will be removed as part of this project. No new travel roads or paved parking areas will be created for this project. Approximately 1.8 acres of new paved trails will be created.

Approximately 10,000 cubic yards of peat and organic soils salvaged from the Ravenna Creek daylighting project have been stockpiled by Seattle Parks and Recreation for use in the habitat portions of the Park. Stockpiling of soils is located west of the Commissary on a paved surface in current conditions, and it will be moved to construction staging areas outside of existing critical areas and will be subject to TESC measures.

4.4 Impervious Surface and Stormwater Treatment

As a result of this project, approximately 12.4 acres of impervious surface will be eliminated and 1.8 acres of paved trails will be created. The winter area distribution of ground surface types, as defined for stormwater calculations, within the project limits will be:

▪ Water	9.4 acres
▪ Vehicular Impervious	0 acres
▪ Other Impervious	1.9 acres
▪ Landscaped Pervious	23.0 acres
▪ Athletic Fields	8.7 acres
▪ Total	43 acres

In summer, the area distribution of ground surface types, as defined for stormwater calculations, created by this project will vary slightly as some water surfaces will dissipate in summer droughts and will change to landscaped pervious surface.

Stormwater detention on the site will not be required because the site drains directly to existing storm drains and surface outfalls into Lake Washington, a major receiving water body as defined by the Washington State Department of Ecology (Ecology). No new outfalls into the Lake will be

created as part of this project. All the new site features and wetland habitat areas will continue to drain to the existing storm drain and surface drainage outfalls into Lake Washington (Figure 4).

No stormwater quality treatment is required for this project because there will be a net reduction in vehicular impervious surface area. However, stormwater treatment will be provided for some existing roads and parking areas as shown on the site grading and site drainage and utilities plans. Stormwater quality treatment measures may include Stormfilter^{R} catch basins and/or vaults, ecology embankments and/or ditches, biofiltration swales, and filter strips. Thus the project will result in a net increase in water quality leaving the site over existing conditions. Over 12 acres of existing impervious pavement will be removed and untreated stormwater runoff will be treated prior to discharge to the Lake. Appendix A includes a map and tables identifying hydrologic and hydraulic patterns, quantities, and durations for the project area.

4.5 Vegetation Clearing

Site design has taken significant care to protect all stands of existing trees/saplings, to the extent possible. Existing stands of trees/vegetation to remain shall be identified prior to construction start up and protected during all construction activities. Large woody debris will be stockpiled and reused from trees removed from the project area. Smaller portions of removed trees will be chipped for re-use in the project.

4.6 Wetland Work, Fill, and Modifications

The proposed project will impact 6.0 acres of wetlands located within Magnuson Park. Direct impacts will be caused by filling wetland, or changing the hydroperiod to the extent that lack of wetland functions is the result. The complete details on wetland impacts, as well as the proposed mitigation for these impacts are provided in the Wetland Compensation Plan for Magnuson Park Phase 2 (Sheldon & Associates 2006).

4.7 Construction Sequence and Schedule

The anticipated construction duration is 15 months. The proposed work window for the project is approximately July 2006 to October 2007. Any work that may directly impact aquatic species will take place during the approved fish window as specified in the Hydraulic Project Approval (HPA).

5.0 DESCRIPTION OF HABITAT AND SPECIES

5.1 Water Resources

Lake Washington is located in WRIA 8. This WRIA is the most densely populated watershed in Washington with approximately 55 percent of the land in this area located within the Urban Growth Area (King County 2005). The population in 2002 was approximately 1.3 million people; the projected population for 2022 is 1.6 million.

Lake Washington is the largest of the three major lakes in King County, and the second largest natural lake in the State of Washington (see Table 2). The lake's two major influent streams are the Cedar River at the southern end and Lake Sammamish via the Sammamish River in the north end. The majority of the nearshore watershed is urban with 63 percent fully developed (King County 2005). The upper portion of the watershed is the headwaters of the Cedar River that lie in a fully forested watershed.

The basin of Lake Washington is a deep, narrow, glacial trough with steeply sloping sides. The average water surface elevation of the lake is 20.6 feet above mean lower low tide in Puget Sound, to which it is connected via Lake Union and the Lake Washington Ship Canal. At the turn of the 20th century, Seattle built the Landsburg Diversion Dam and tapped the Cedar River as its main source of water. Between 1910 and 1920, the Ship Canal and Ballard Locks were built, which created a new connection between Lake Washington and Puget Sound. Prior to construction of the canal, the only significant inflow was from the Sammamish River in the north. It also changed the outlet of Lake Washington from the Black River at the south end of the lake, to the Ship Canal at the west end. This caused Lake Washington's water surface elevation to drop, which in turn also dropped the level of Lake Sammamish and dried up much of the wetlands along the Sammamish River. Specifically, construction of the canal resulted in the lowering of the lake 9 feet to its present level, leaving the Cedar River diverted into Lake Washington.

Table 2. Physical Characteristics of Lake Washington and its Drainage Basin.

Physical Feature	Attribute (English units)	Attribute (Metric units)
Drainage area	300,000 acres	1,274 km^2
Lake area	21,500 acres	87.6 km^2
Lake volume	2,350,000 acre-ft	$2.9x10^9$ m^3
Mean depth	108 feet	32.9 m
Maximum depth	214 feet	65.2 m
Flushing rate	0.43 per year	
Depth of epilimnion	39 feet	12 m
Epilimnion:Hypolimnion ratio	0.387	
Length	22 miles	35 km
Main inflows	Cedar River (57%) Sammamish River (27%)	
Main outlet	Ship Canal to Puget Sound	
Typical period of stratification	Late March to early November	
Trophic state	mesotrophic	

5.2 Water Quality

At one time, sewage and wastewater were discharged directly into lakes Washington, Union, and Sammamish. The lake received increasing amounts of secondary treated sewage between 1941 and 1963, which resulted in increased nutrient enrichment (eutrophication) and declining water quality.

From 1955 to 1973, the lake's algae were dominated by cyanobacteria, which can be severe bloom-forming nuisances.

In an effort to improve water quality, sewage effluent was completely diverted from the lake during 1963 and 1967, except for infrequent untreated combined sewer overflows (King County Wastewater Treatment Division 2001). Rapid and predicted water quality improvements followed diversion with dramatically decreased algae abundance and associated increased transparency. Today sewage and wastewater enter secondary treatment facilities at West Point and Renton. From there, treated water is discharged into Puget Sound.

Overall, Lake Washington has recovered from the eutrophic, over enriched state that existed in the 1950s to 1960s. The key to rapid recovery was the lake's depth, which contained large stores of dissolved oxygen and the reduction in phosphorus (P) loading that occurred with sewage diversion. The lake is sensitive to P loading, and the maintenance of present-day water quality is dependent on keeping P loading at or below current levels. Minimal development of the Cedar River basin has been a key factor in recovery and maintenance of lake water quality.

5.3 Physical Habitat

The shoreline of Lake Washington has been extensively altered. Historically, more commercial development was located on the lakeshore, but as the population in the watershed has grown, the demand for residential waterfront property increased significantly. The majority of the shoreline is now urban, residential, with the exception of a few commercial and industrial developments. Thirteen incorporated cities now border the lake.

As the watershed has developed, dredging, filling, bulkheading, and the construction of piers, docks, and floats have occurred in shoreline areas. An estimated 82 percent of the Lake Washington shoreline has been bulkheaded. Overall, about 70 percent of the Lake Washington shoreline is retained by either rip-rap or bulkheads, while 30 percent of the shoreline remains unretained as beach, naturally vegetated, or landscaped.

Much of the large woody debris that was likely associated with the lake's shore has been eliminated. The only "natural" shoreline remaining in Lake Washington is in the vicinity of St. Edwards Park, which represents less then 5 percent of the lake's shoreline. A recent survey of the lake's shoreline under the City of Seattle's jurisdiction indicated that "natural vegetation" was present along only 22 percent of the northern shoreline and 11 percent of the southern shoreline (Seattle Parks and Recreation 2001).

The limnological characteristics of Lake Washington have undergone dramatic changes as well. Except for combined sewer overflows, sewage effluent was completely diverted from the lake by 1968 and the lake subsequently reverted to a mesotrophic state. The size, quality, and low elevation of the lake are critical for its providing excellent habitat for fish. Juvenile endangered chinook salmon use the littoral zone for rearing and migration to the ocean. Currently the level of the lake is not allowed to fluctuate more than 2 feet.

5.4 Vegetation and Wetlands

Land uses on the site since the early 1900's have strongly influenced existing conditions in Magnuson Park. The existing vegetation communities on site are all early-successional stages of upland and wetland habitats that are less than 30 years old, with the exception of the forests on Promontory Point, which is not part of the Phase 2 project. Soils are severely compacted and missing major organic components, including detritus. Hydrology is driven by precipitation, sheet flow and winter ponding on the compacted soils, not by ground water. The extreme soil conditions on site strongly influence the site hydrology, and therefore the plant communities present. Appendix C contains representative photos of upland and wetland habitat in the Phase 2 area.

5.4.1 Upland Community Types

The following upland vegetation community type descriptions were used in the Magnuson Park Vegetation Management Plan (Sheldon & Associates 2001); they are used here for consistency (wetland communities are described below).

- Mowed grasslands: these are regularly maintained lawns near the swim beach area, surrounding the existing tennis courts, and at the Sand Point and Magnuson Park grass sports fields. They are 100 percent non-native turf/lawn grasses managed for high-use activities.

- Upland meadow: these are unmowed or infrequently mowed grasslands with native and nonnative grasses comprising the dominant species. They are present within the interior portions of the habitat area, north of the Fin Art display, and within some portions of the shoreline zone. The grasses in these areas are mowed only in the fall, and they are not always mowed annually.

- Savannah: these are open expanses of meadow with scattered native or non-native trees and shrubs (note that the woody species do not form a closed canopy, but are groves or thickets of vegetation surrounded by unmowed grasslands). Savannah is present within the interior portions of the site, near the base of Kite Hill, and near the boat launch parking lot. Tree species may include Lombardy poplar, black cottonwood, hawthorn and Oregon ash. Shrubs can include Scot's broom, blackberry, spiraea, upland willows and madrone.

- Non-native shrub thickets: these areas are comprised of dense stands of Himalayan blackberry or stands of Scot's broom, often in 100-percent monotypic stands. They are scattered throughout the site, with the Scot's broom thickets more common on and near Kite Hill, while blackberry thickets are found throughout the site. In addition, blackberry are found as single plants along forest and woodland margins where it may not be dense enough to qualify as 'thicket.'

- Non-native trees: Lombardy poplar stands may include white poplar and hybridized crossbred poplars. Lombardy poplar was planted on the site several decades ago in a typical "allee" manner, as a boulevard tree along the former NOAA access road, near the Community Activity Center, and near the existing tennis courts. It is a highly invasive species, colonizing by root clones radiating out from the parent trees.

- Deciduous forest: this is a mixed-canopy forest, dominated by big-leaf maple and red alder. Some planted young conifers may be present but they do not represent a notable habitat feature at this stage. Deciduous forest habitat predominates at Promontory Point. The forest includes invasive nonnative species such as English ivy and virgin's bower, which are found in extensive swaths in some places, while other portions of the forest are not overwhelmed by these invasive species.

5.4.2 Wetland Community Types

Human activities on the site over the last 30 years have also strongly influenced the extent, species composition, and functions of the existing wetlands. Due to the impervious nature of the soils and the relatively flat gradients, the majority of the interior habitat zone of the site is a mosaic of both upland and wetland communities. Wetlands were delineated based upon protocol developed and agreed upon by the regulatory agencies, and included both the routine and comprehensive determination methods described in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), as well as statistical approach methodology. See the Magnuson Park Wetland Delineation Report for additional detail (Sheldon & Associates 2005), and refer to Figure 5 for wetland distribution in the landscape.

A total of 29.84 acres of wetland is found on the project site, including approximately 0.22 acres of excavated ditches. The majority of wetland within the project area, however, consists of three existing wetland community types, based upon the USFWS classification derived from Cowardin et al. (1979). These wetland types and their dominant plant species are described below.

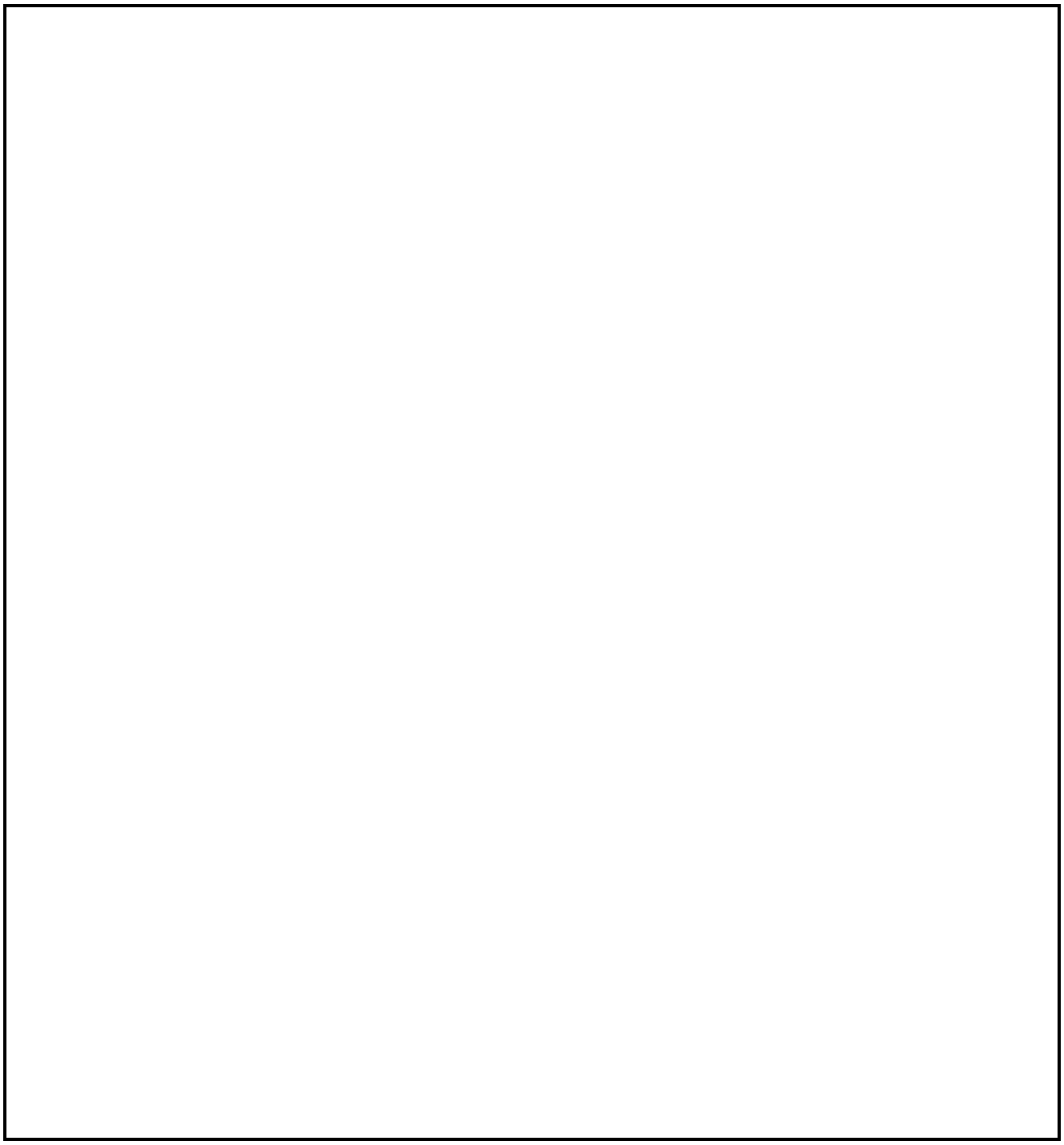

Figure 5. Wetlands map of Master Planning Area in Magnuson Park.

- Palustrine Emergent wetland (PEM): these areas are generally characterized as having longer-term inundation into the growing season, a higher plant species diversity and more wet-tolerant species than the wet meadows, and generally have 4 to 18 inches of standing water into the spring. Species present include various native sedges, spikerush, native wet grasses and bulrushes. Frog Pond and several small closed depressions south of it are included in this wetland type. In addition, there is marsh habitat just north of NE 65th Street, both east and west of Sportsfield Drive. Some of these marshes are ringed with native shrubs and sapling-stage trees, although they have been mapped as emergent communities because that is the dominant vegetation type present.

- Palustrine Scrub/Shrub wetland (PSS): these wetlands generally consist of willow/spirea shrub wetlands with interspersed emergents. Willows dominate along most of the ditches that traverse the site, with smooth rush, reed canary grass and various other wet grasses present amidst the shrubs. Willows also dominate the "outlet channel" that empties into Lake Washington at a location just north of the boat ramp, with yellow iris and purple loosestrife present in the understory. Near the south toe of Kite Hill is a mixed community of sedges and spiraea, with the sedges forming a distinct vegetation type but the spirea dominating the overall coverage (i.e., the sedge stand is too small to map at this scale).

- Palustrine Forested wetland (PFO): these are generally black cottonwood stands with little or no understory present (some may have sparse spike rush). The trees tend to be the same age class and the closed depressions tend to pond water up 6 to 8 inches deep over the winter.

Further details and description of individual wetlands occurring in Magnuson Park, including functional assessments, may be found in the Magnuson Park Wetland Delineation Report (Sheldon & Associates 2005) accompanying this BE.

6.0 SPECIES OCCURRENCE

6.1 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles are currently listed as a threatened species in Washington State under the federal Endangered Species Act (50 CFR 17.11). Although bald eagle populations have been proposed for delisting by the United States Fish and Wildlife Service due to recovery of the species, the bald eagle nevertheless remains listed as a threatened species at the federal level.

6.1.1 Life History

Bald eagle populations in Washington State are comprised of both resident and overwintering individuals, depending on the time of year. Resident birds breed in Washington, establishing territories and nesting within a mile of open water. A substantial portion of the diet of bald eagles consists of fish, and eagle nest proximity to rivers, streams, lakes, and other bodies of open water reflects this. Breeding territories are often found in riparian corridors along rivers; further from water, breeding territories are typically dominated by coniferous, uneven-aged stands with some

old growth characteristics (Anthony, et al. 1982). Nearby habitat often consists of trees containing exposed lateral limbs or dead tops, and areas that show snag habitat (USFWS 1986). Bald eagles utilize these habitat features as foraging and hunting sites, perching on open limbs and branches to locate potential prey.

Bald eagle breeding activity occurs from 1 January until 15 August. Courtship and nesting in the Pacific Northwest occur within the winter months, from January until February. Eggs are generally laid in March and April, and typically hatch within 4-6 weeks—although eagle pairs that breed later may not hatch offspring until June. Fledging of nestlings usually occurs in July but can occur as late as September, and juveniles will sometimes remain within the vicinity of the natal nest for a month or so following fledging.

The overwintering period for bald eagles extends from the end of October until March. Eagles forage along river stretches and lake shores during both breeding and overwintering periods; typical prey consists of salmon, other fish, various birds, rabbits, squirrels, and carrion (Ehrlich et al. 1988).

6.1.2 Bald Eagle Occurrence in Project Vicinity

According to WDFW records, a bald eagle nest occurs more than 0.5-miles from the project site, to the southwest. The immediate vicinity of the Magnuson Park area does not provide a great deal of opportunity for eagles to establish a nest, due to the inappropriate nature of the available trees on site to act as nest trees, and the level of human and dog activity in the park.

The possibility exists for eagles to utilize habitat in and near Magnuson Park for foraging—particularly along the shoreline of Lake Washington. Overwintering bald eagles may also occur within the 0.5-mile project action area radius. Bald eagles generally avoid foraging in areas where human activity is pronounced and obvious, and residential areas away from Lake Washington are unlikely to be frequented by foraging eagles, due both to human activity and distance from the water. Bald eagles almost certainly forage within the project action area, and are likely to utilize the northeast portion of Magnuson Park as a frequent foraging site, due to the numbers of suitable perch trees in proximity to the waters of Lake Washington. Much of the rest of the park, however, is unlikely to provide foraging habitat due to a lack of sufficient perch trees near the water, and the amount of human activity associated with the park (pedestrians, dogs, boats, etc.).

6.2 Bull Trout (*Salvelinus confluentus*)

Bull trout in the Coastal/ Puget Sound ESU were listed as threatened under the Endangered Species Act by the U.S. Department of Fish and Wildlife on November 1, 1999. Accordingly, information on the presence or absences of this fish species is required as part of the Section 7 project review process.

6.2.1 Bull Trout Occurrence in Project Vicinity

There is no known spawning subpopulation resident in Lake Washington or Lake Sammamish. However, sub adult and adult native char are occasionally found in the lakes (USFWS 1998). Reproducing populations of bull trout/Dolly Varden, principally the latter, occur in the upper Cedar River basin in Chester Morse Lake, but have not been confirmed in the lower Cedar River, Lake

Washington, Lake Sammamish or their tributaries. Reports of Dolly Varden from Lake Washington are rare. None were seen in a one-year survey on Lake Sammamish (Bradbury and Pfeiffer 1992), however one was identified during a two-year creel survey on Lake Washington (Bradbury and Pfeiffer 1992). This was a 370 mm fish taken by a shore angler near Kirkland in April 1981. Two bull trout/Dolly Varden were reported holding below a culvert in the headwaters of Issaquah Creek in the fall of 1993 (Fuerstenburg, Bob-King County Surface Water Management, personal communication). It is possible that these three fish were anadromous fish which had strayed into Lake Washington system via the Ballard Locks and were not part of local spawning population within the lower two-lake system. Water temperatures in the lower Cedar River and Issaquah Creek are probably too high to support bull trout/Dolly Varden.

No self-sustaining populations of native charr including bull trout have been documented within the project vicinity (KCDNR 2000; USFWS 1998; WDFW 2004b). In addition, no populations of native charr have been identified in Lake Washington and Lake Sammamish (Figure 6). Identification of these individual fish does not conclusively indicate the presence of bull trout populations, but it does suggest that fish occasionally migrate into these lakes and their tributaries. In fact, the migratory patterns of anadromous bull trout are such that they migrate to the ocean in the spring and then they may randomly enter other stream systems to forage (KCDNR 2000).

The term "native charr" pertains broadly to that species complex and could apply to a specific group within that complex such as bull trout. However, additional information not currently available is necessary to make that connection and therefore all fish in the complex are referred to as native charr.

To address USFWS and WDFW data gaps on the distribution and status of bull trout/native charr subpopulations within King County, KCDNR has designed a pilot program to generate data describing the presence or absence of these fish in this area. Phase I of this program was to identify watersheds that were highly suitable for bull trout and/or would support bull trout during a portion of their life history. Neither Lake Washington nor Sammamish were listed as recommended watersheds for survey work, indicating that the KCDNR and WDFW do not consider these watersheds priority habitat for bull trout. Lake Washington, however, is proposed as critical habitat for bull trout by the USFWS (see 6.2.3 below).

6.2.2 Existing Habitat Evaluation for Bull Trout

Incidental observations of bull trout in Lake Washington and Lake Sammamish suggest that bull trout do occur in WRIA 8. Bull trout require specific habitat conditions suitable to their life history needs. For example, water temperature conditions during the summer are an important component of rearing and growth of bull trout. Goetz (1989) suggests optimum water temperature for bull trout rearing at approximately 35.5^{o}F. Sub-lethal effects are evident at temperatures exceeding optimum (Lantz 1970). High summer water temperatures in Lake Washington likely preclude summer use by bull trout. Bull trout typically spawn in the fall (Groot and Margolis 1991), and prefer larger streams (if accessible) that have a cold groundwater upwelling component (Pratt 1992). Water temperature above 15^{o} C (59^{o} F) is believed to limit bull trout distribution, which may partially explain their generally patchy distribution within some watersheds (Rieman and McIntyre 1993).

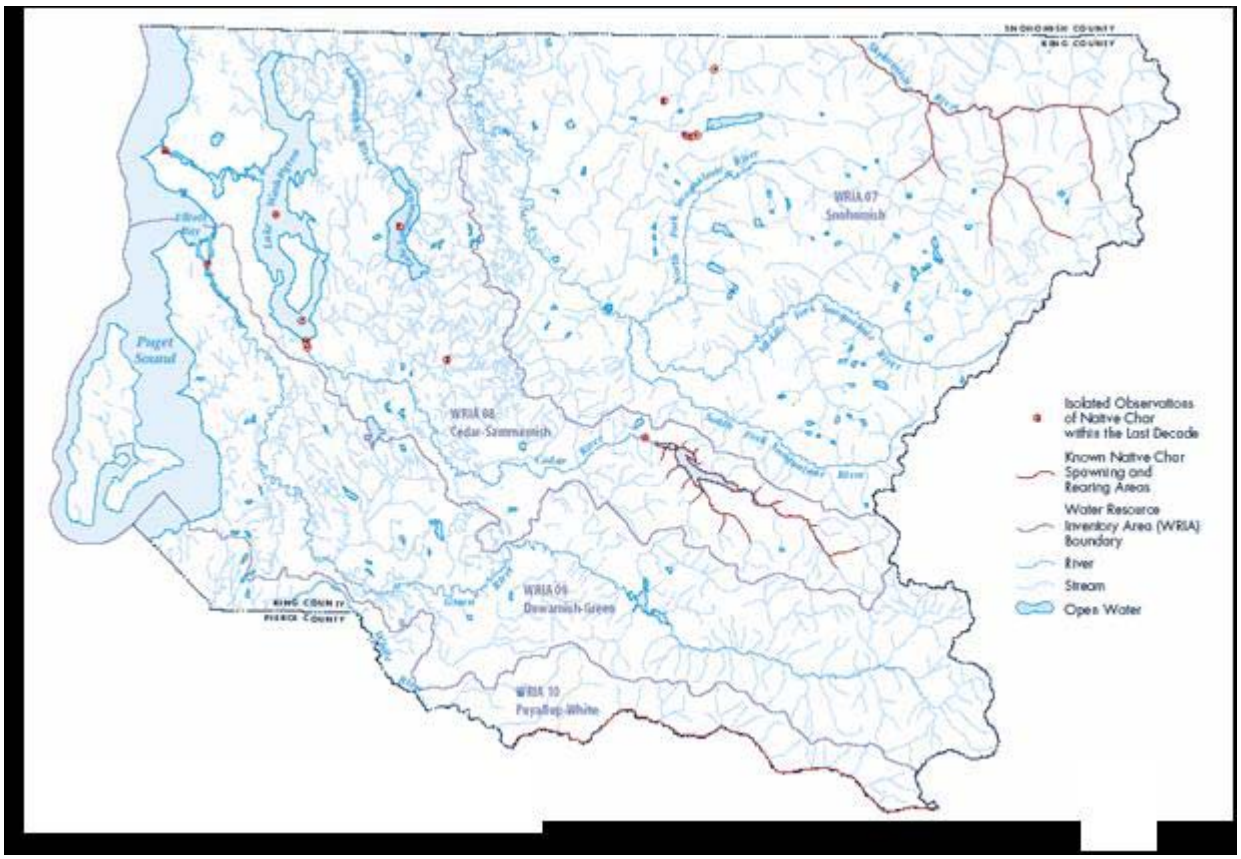

Figure 6. Current Known Distribution of Self-sustaining Native Charr Subpopulations and Isolated Observations of Native Charr in King County.

The distribution of sub adults and adults in lakes and reservoirs appears to be temperature mediated, with fish generally avoiding temperatures greater than 15° C, and preferring temperatures less than 10° C. Following stratification of lakes in the spring, bull trout are mostly found below the thermocline, and generally near the lake bottom. The diet of bull trout in lakes consists almost entirely of fish, and the species composition within the diet varies with the relative abundance of prey species in the lake. The presence of warm-water prey species, such as yellow perch (*Perca flavescens*), in the diet of bull trout indicates that they either make occasional forays into warmer (17–20° C) nearshore waters or exploit prey during winter and spring. Bull trout have also been observed aggregating to take advantage of localized prey abundance such as concentrations of spawning prey fish.

Beach spawning of native char in Lake Washington and Lake Sammamish is improbable. Confirmed observations of beach spawning bull trout are limited to extreme downwelling conditions in cold, high-elevation lakes (WDFW 1998); water temperatures in Lake Washington and Lake Sammamish are too high for successful incubation.

The results of the habitat evaluation for bull trout indicate that the habitat is generally considered to not be properly functioning. Although it is possible that bull trout could be present in Lake Washington, the habitat is not suitable for this species, and therefore bull trout use would be severely limited. Specifically, the lack of deep pools, paucity of wood, high levels of fine sediment, and high water temperatures present unsuitable habitat conditions for bull trout. These results are the primary indicators that the habitat would not likely support bull trout during any life history stage.

6.2.3 Proposed Designated Critical Habitat for Bull Trout

Designated critical habitat for bull trout has been established for bull trout runs in the Columbia River and Klamath River evolutionarily significant units (ESU), and critical habitat is proposed for the Coastal/Puget Sound bull trout ESU. The proposed critical habitat includes Lake Washington. Thus, proposed critical habitat for bull trout includes this project's action area for aquatic species.

6.4 Chinook Salmon (*Oncorhynchus tshawytscha*)

In May 1999 the Federal Government listed the Puget Sound Chinook salmon ESU as threatened under the ESA. Furthermore, NOAA adopted a detailed 4(d) Rule in July 2000 codified at 50 CFR 223.203, to prohibit take of 14 groups of salmon and steelhead (including Puget Sound Chinook) listed as threatened under ESA. The Rule took effect on September 8, 2000, and became effective within the Threatened ESU on January 8, 2001.

6.4.1 Chinook Occurrence in Project Vicinity

WRIA 8 chinook populations are unique from other populations in the Puget Sound ESU as they are the only ones that use a lake for rearing and migrating. There are two populations of Chinook that use the Lake Washington Basin. The Cedar River population spawns in the Cedar River's main stem and to a lesser extent in its tributaries. The North Lake Washington population spawns in the tributaries to northern Lake Washington and the Sammamish River, including Bear, Little Bear, North, and Kelsey creeks. In this basin, lakes represent a major fraction of the juvenile rearing habitat and migratory corridor for wild chinook salmon. Migration timing out of the Cedar

River and Bear Creek are bimodal with a peak of smaller fry entering Lake Washington in late February-early March and larger river-rearing smolts entering in early June. Salmon from these populations migrate in and out of the watershed through the lakes, Ship Canal, and Locks.

When juveniles leave the Cedar River in the spring, they rear and migrate in shallow habitats along Lake Washington's shorelines, particularly in the south end. Juvenile chinook salmon are found in Lake Washington and Lake Sammamish primarily in the littoral zone. The abundance of chinook is strong correlated with the shoreline distance from the mouth of the Cedar River. Juveniles tend to inhabit the nearshore area from February to mid-May and prefer shallow water with a gentle slope and small substrate. Fish are active during the day and may use overhead such as docs or piers along the shoreline. At night fish are inactive and generally rest on the substrate. After mid-May, juveniles move into deeper water where little is known about their habitat use.

6.5 Coho Salmon (*Oncorhynchus kisutch*)

NOAA provisionally decided in July 1995 that coho salmon were not then warranted for listing in Puget Sound. However, because of "sufficient concern regarding the overall health [of Puget Sound coho]", NOAA identified it as a "candidate" species, allowing for reevaluation of the data and reconsideration of this decision. Coho are found throughout almost all of the Cedar/Sammamish WRIA 8. They are adapted to small streams, but are especially sensitive to the effects of urbanization.

6.5.1 Coho Occurrence in Project Vicinity

In the Lake Washington system, coho salmon stocks have been divided into the Lake Washington/Sammamish Tributary stock and the Cedar River stock (WDFW et al. 1993). Adult coho salmon migrate through Lake Washington and Lake Sammamish to reach spawning grounds in the Cedar and Sammamish River systems, and in small tributaries to the lakes. Adults begin migrating into fresh water in August, and spawn from late October through December in most systems, and through mid-March in the Cedar River (WDFW et al. 1993).

Studies at the mouth of the Cedar River have shown that most coho enter Lake Washington in May and June, and are 100 mm or greater (City of Bellevue 2005). Beyond the contribution of natural spawners, WDFW's Issaquah Creek hatchery has an annual production goal of releasing 1 million age-0+ coho and 450,000 yearlings into Issaquah Creek each spring, many of which enter Lake Washington via the Sammamish River.

The distribution of juvenile coho salmon in Lakes Washington and Sammamish is poorly understood. There is evidence that juvenile coho are migrating and feeding along the Lake Washington shoreline (City of Bellevue 2005). Tabor and Chan (1996) found coho smolts in south Lake Washington from April to early June, with peak abundance in early May. Coho juveniles are less commonly encountered in sampling efforts than chinook and sockeye.

Water temperature affects the distribution of coho salmon in lakes and reservoirs. Bjornn and Reiser (1991) reported the preferred temperature for coho as 12 to 14° C, and that temperatures from 23 to 25° C could be lethal and were actively avoided by most salmonids. This preference for

lower water temperatures in the littoral zone during the summer segregates them from shore-based sampling efforts.

6.6 Listed or Candidate Bird Species (other than bald eagles)

6.6.1 Marbled Murrelet (*Brachyramphus marmoratus*)

The Washington, Oregon, and California populations of marbled murrelet were listed as threatened under the ESA in 1992. Critical habitat for marbled murrelets was designated in 1996, and this species is listed as threatened by Washington State.

Life History: Marbled murrelets are small seabirds of the auk family; they have long wings and short bills and tails. In North America, they range from the Bering Sea to central California. Marbled murrelets spend most of their time near coastal areas, diving for and feeding on a wide variety of marine prey—especially crustaceans and fish—while on the water. Marbled murrelets spend the winter months foraging within 0.3 to 2 km of the shore (USFWS 1996) and moving further offshore during the nights. Murrelets often aggregate in areas of abundant forage resources, displaying locally clumped distribution patterns (Sealy and Carter 1984).

During breeding season, however, marbled murrelets will sometimes fly inland to distances up to 70 km (SEI, 1997) in order to nest. Nesting sites are tightly correlated with the presence of old growth forest, as the marbled murrelet constructs its nest in the large, mossy branches of old growth trees with high canopy cover. In May, the birds move northward to their breeding grounds in a diffuse migration. By May, marbled murrelet females have laid a single egg in a cup-shaped nest high in large, mature trees, and parents take daily turns incubating the egg while the other bird feeds in the coastal waters. Both parents feed the young chick once the egg hatches. To provide food for their young, the parent birds fly to the coastal waters, forage, and then return to the nest site at night with fish prey items that they feed to the young chick.

Marbled Murrelet Occurrence in Project Vicinity: Marbled murrelets are exceedingly unlikely to be present in the project action area. No suitable nesting habitat is available, and the nearest foraging habitat for this bird species is in the Puget Sound, well outside of the project action area.

Designated Critical Habitat for Marbled Murrelet: Designated critical habitat refers to specific geographic areas that are essential for the conservation of a threatened or endangered species, and generally encompasses habitat that individuals require in order to successfully reproduce (Federal Register 1996). Marbled murrelets breed in old-growth forest habitat, and no such habitat occurs in the project vicinity. Although designated critical habitat for marbled murrelets is present within King County, the habitat blocs all occur in the forested eastern portion of the county, and no designated critical habitat is designated within the Puget Lowlands. The closest designated critical habitat for marbled murrelets occurs in the eastern portions of the Cascades, approximately 25 miles away.

6.6.2 Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl was designated as threatened under the ESA on June 26, 1990, over its entire range.

***Life History*:** The northern spotted owl is a subspecies of the spotted owl, a medium-sized, nocturnal predatory bird that nests in cavities in trees. The diet of spotted owls consists mainly of rodents, particularly northern flying squirrels, with occasional lagomorphs (e.g. rabbits, hares) included.

Northern spotted owls are associated with old growth forests, which provide the nesting and roosting habitat the owls need. Typically, good roosting and nesting habitat is characterized by moderate to high canopy closure (60 to 80 percent closure); a multi-layered, multi-species canopy with large overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and debris accumulations); large accumulations of fallen trees and other debris; and sufficient open space below the canopy for owls to fly (Thomas, et al. 1990). While northern spotted owls may successfully forage in more open areas, old growth forests provide ample numbers of the owls' preferred prey: northern flying squirrels. Thus, to a large extent, northern spotted owls are dependent upon old growth forests for survival and successful breeding and nesting

Northern spotted owls frequently nest in the tops of broken trees, within cavities in the tree trunks, on mistletoe brooms, or occasionally use squirrel or raptor nests as platforms on which to build their own nests. Pairs form in February or March; northern spotted owls often form lifelong pair bonds. Egg laying takes place in March and April and usually two to three eggs are produced. One brood is produced each season. Eggs are incubated for 30 days, and the young fledge 34-36 days after hatching. The female incubates the egg and broods the young for the first 8-10 days after hatching; during this period, the male brings her food. Some owls forage during the day to take care of the young at night.

Northern Spotted Owl Occurrence in Project Vicinity: Given the absence of old growth forest in the vicinity of the project area, it is extremely unlikely that any northern spotted owls occur near the project site. The WDFW (1997) gap analysis model for spotted owl shows that breeding incidences and appropriate habitat for this species occurs in the mountainous eastern portion of King County.

Designated Critical Habitat for Northern Spotted Owl: While designated critical habitat for northern spotted owls occurs within King County, no designated critical habitat occurs within the project action area. Designated critical habitat for this species encompasses the forested slopes within the Cascades and Olympics mountain ranges. Northern spotted owls in Washington are strongly associated with old growth conifer forests, and no such habitat is currently found in the vicinity of the project site. Although northern spotted owls can utilize more open areas for foraging, designated critical habitat for this species requires the availability of nesting and roosting microhabitat (Federal Register 1992); such microhabitat is not present within the project action area.

6.6.3 Yellow-billed Cuckoo

A candidate species is one for which the USFWS have on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but for which preparation and publication of a proposal is precluded by higher-priority listing actions (Federal Register, 2001). The western continental U.S. distinct population segment (DPS) of the yellow-

billed cuckoo is listed as a candidate species, and was petitioned in 1998 to be considered an endangered species under the ESA.

Life History: Yellow-billed cuckoos are medium-sized birds with relatively heavy, down-turned bills and long tails. This species utilizes woodland habitat containing thick undergrowth, and the western DPS of yellow-billed cuckoos favor riparian habitat, especially dense thickets of cottonwood and willow. Yellow-billed cuckoo diet consists principally of large insects such as caterpillars, grasshoppers, and cicadas, but adult birds will eat other birds' eggs, frogs, lizards, and berries, as well (Ehrlich et al. 1988).

This species requires large tracts of riverine riparian habitat for nesting. Home ranges during breeding season can average from 17 to 40 hectares (Halterman 1991; Laymon and Halterman 1988). Within the Sacramento River system, Gaines (1974a and 1974b) showed that yellow-billed cuckoos were present only when suitable riparian habitat on the river exceeded 100 m in width and 300 m in length, and a total area of at least 10 hectares. Large areas of suitable habitat are necessary to provide sufficient foraging, as yellow-billed cuckoo eggs are large and heavy (Lack 1968), and are energetically very costly for the female bird to produce (Schifferli 1973).

The last confirmed breeding records were in the 1930s in Washington, and the species may now be extirpated from the state (Federal Register 2001). The yellow-billed cuckoo is ranked as critically imperiled as a breeding bird in Washington, and is under review by the Washington Department of Fish and Wildlife for State listing (WDFW 2004c).

Yellow-billed Cuckoo Occurrence in Project Vicinity: Yellow-billed cuckoos utilize riparian habitat for nesting and foraging purposes, requiring relatively large tracts of river bottom and riparian tree habitat such as cottonwood groves and willow thickets. The fact that the on-site habitat is not appropriate for yellow-billed cuckoos, and the fact that this bird is vanishingly rare in Washington State, makes it extremely unlikely that this species occurs in the project vicinity.

6.7 Listed or Candidate Carnivorous Mammals

6.7.1 Canada Lynx (*Lynx canadensis*)

Within the contiguous United States, the Canada lynx was listed as threatened under the ESA on March 24, 2000. The lynx has been listed as threatened at the state level in Washington since October 1, 1993.

Life History: The Canada lynx is a relatively large cat that is normally found in northern, forested areas or in higher, more remote mountains. Primarily feeding on snowshoe hare, lynxes will also supplement their diets with rodents and birds, covering up to 12 miles during a single night of hunting. Denning in hollow logs and other sheltered areas within mature forests; lynxes are rarely seen—due to their shyness, nocturnal habits, and their predilection for remote, isolated habitat.

Mating occurs in January or February, and young are born in the early spring after a 60-day gestation period. Usually one to four kittens is born; weaning occurs within two to four months, but the young stay with the mother for approximately one year. Lynxes may live up to 15 years in the wild.

Canada Lynx Occurrence in Project Vicinity: No lynx occur within the project action area, as the nearby habitat is not at all suitable for this animal. In addition, the Burke Museum of Natural History at the University of Washington and the WDFW both indicate that the current range of the lynx does not extend into King County (WDFW 1997), and that core habitat for this species exists only in the north Cascades and the Okanogan highlands.

6.7.2 Gray Wolf (*Canis lupus*)

Under the ESA, the gray wolf was listed as endangered or threatened within the contiguous U.S. on March 11, 1967. Gray wolves had been extirpated from Washington State prior to the 1930's, and have recolonized the state from Canada. Gray wolves have been considered endangered in Washington since 1980.

Life History: The largest wild canids in North America, gray wolves are pack animals with a complex social organization. Usually organized as family units, wolf packs generally contain 8-12 individuals and are led by the dominant (alpha) male and female. The alpha pair is reproductively active, and engage in behavioral suppression of the reproductive cycles of other members of the pack. Wolf diet is varied, and may consist of small mammals such as ground squirrels, rabbits, and hare, but may also include large ungulates such as deer and elk, which the pack hunt cooperatively. Wolves generally reside in wilderness forests and tundra, and may hunt over territories ranging from 50 to up to 1000 square miles, depending upon prey availability.

Wolves may begin to breed at two or three years of age, but in packs the alpha pair engages in breeding while other non-related adults do not. The alpha pair breeds in winter, from January until March, and the gestation period is approximately 61-63 days. Weaning occurs at about 8-10 weeks, and juveniles will often disperse away from their natal pack at one or two years of age. Wolves may live up to 13 years in the wild.

Gray Wolf Occurrence in Project Vicinity: Due to the lack of suitable habitat and the proximity of an urban environment, no gray wolves occur in the vicinity of the project.

6.7.3 Grizzly Bear (*Ursus arctos*)

On March 11, 1967, grizzly bears were listed as threatened for the lower 48 states of the U.S., and in 1974 grizzly bears were listed as threatened under the ESA. At the time of preparation of this BE, the grizzly bear has been proposed for delisting by the USFWS. The species is considered endangered at the state level within Washington.

Life History: The largest carnivore in North America, grizzly bears may weigh up to 800 lbs for males, and up to 400 lbs for females. Within the conterminous U.S. grizzly bears are rare, found in high mountains and wilderness areas. Generally, grizzlies are solitary; occasionally small family groups—usually a mother and her cubs—are seen. Cubs will stay with their mother for up to three years.

Grizzlies require a great deal of area in which to forage; home ranges usually encompass 25 square miles of area, and sometimes up to 50 square miles. The diet of grizzlies is omnivorous, with meat, fruit, grass and other green vegetation, grubs and insects, and nuts, roots, and bulbs of various

plants comprising the broad spectrum of forage material. Grizzlies must eat enormous quantities of food to store up the fat necessary for engaging in cold-weather torpor.

Grizzlies breed starting at four years of age, although some may breed at three years of age and others not until seven or eight years of age. Females breed in alternate years or once every three years. Mating occurs in the summer (May-July), and the young are born in late fall or winter after a six month gestation period. Cubs continue to feed on their mother's milk for up to a year, and remain in their mother's company for a year or two beyond that before dispersing.

Grizzly Bear Occurrence in Project Vicinity: Given the rarity of the species and the montane forest habitat they occupy, no grizzly bears are in the vicinity of the project area.

6.7.4 Pacific Fisher (*Martes pennanti pacifica*)

The fisher is a stocky predator of the weasel family, about the size of a house cat. These animals are rather shy and solitary forest dwellers, and prefer to nest in rotting logs or tree cavities. The fisher has a highly variable diet that includes mammals (such as shrews, squirrels, hares, muskrat, porcupine and beaver), birds, carrion, and fruit. Fishers use forests with a high percentage of canopy closure, abundant large woody debris, large snags and cavity trees, and diverse understory vegetation. Generally, fishers are associated with late-successional forests, in part because of the prey diversity these forests provide (Lewis and Stinson 1998).

Pacific Fisher Occurrence in Project Vicinity: Fishers are extremely rare in Washington State, and may actually be extirpated from the state. Few sightings or reports have occurred since 1980, and no confirmation of fishers in Washington has occurred since 1990, despite extensive surveys (Lewis and Stinson 1998). WDFW (Jacobsen et al. 2003; Lewis and Stinson 1998) indicates that no suitable habitat for fishers exists in or around Seattle, and it is extremely unlikely that any individuals of this species occur within the project action area.

6.8 Listed or Candidate Marine Species

6.8.1 Humpback Whale (*Megatpera novaengliae*)

The humpback whale was listed as endangered throughout its range on June 2, 1970. Intensive hunting through the 19th and into the 20th centuries resulted in drastic reductions in population numbers for this species.

Life History: Humpback whales are baleen whales that are highly migratory, with the northern Pacific subpopulation traveling thousands of miles between tropical and subtropical breeding grounds in the winter, and northerly feeding grounds in the summer (e.g. off the Alaska coast and in the Bering straits). Migratory routes are characteristic and consistent from year to year, and include routes along Washington State's outer coast. Although no resident humpback whale populations occur in Washington or Oregon, migrating whales may be seen traveling along both states' coasts in fall and spring.

Humpback whales feed primarily on small fish and krill, using a variety of methods for catching prey and relying upon the consumption of huge amounts of food to restore fat reserves for

migration and breeding. Thus, feeding grounds are concentrated in the rich, cold waters of the high latitude seas.

Humpback Whale Occurrence in Project Vicinity: The project site is several miles from the Puget Sound. No humpback whales occur within the project action area.

6.8.2 Leatherback Sea Turtle (*Dermochelys coriacea*)

The leatherback sea turtle was listed as endangered throughout its range on June 2, 1970. Human exploitation of the turtles, and loss of breeding habitat and associated disturbances have led to severe declines in the populations of this species.

Life History: Leatherback turtles are the largest, most pelagic, and deepest-diving of all sea turtles in the world. Preying on a wide variety of invertebrates (jellyfish, sea urchins, squid, crustaceans, etc.) and seaweed, leatherback turtles show a worldwide distribution in tropical and temperate marine waters. Occurring in the Atlantic, Pacific, and Indian Oceans, leatherback turtles are only occasionally seen in waters off of the west coast of the United States and Canada. Nesting takes place from February until July—usually on warm, sandy beaches that are in close proximity to deep water and are backed by vegetation. In the United States, small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year). No nesting sites occur within the Puget Sound basin.

Leatherback Sea Turtle Occurrence in Project Vicinity: The project site is several miles from the Puget Sound. No leatherback sea turtles occur within the project action area.

6.8.3 Southern Resident Killer Whale (*Ocrinas orca*)

The distinct population subunit (dps) of southern resident killer whales was listed as endangered under the ESA on November 15, 2005—scheduled to go into effect February 16, 2005.

Life History: Killer whales, or orcas, are the largest members of the dolphin family. The species as a whole is one of the most widely distributed marine mammals on earth, ranging from tropical to polar waters, but preferring coastal areas at higher latitudes. The southern resident killer whale dps refers to those orcas that reside in Puget Sound, the Strait of Juan de Fuca, and the southern Georgia Strait during the spring, summer, and fall.

Killer whales are social in their behavior, traveling and hunting in pods. They are top predators with a broad diet, consisting of fish, other marine mammals, squid, seabirds, and the occasional sea turtle. Although far ranging and known to enter larger, freshwater rivers in various parts of the world, the southern resident dps is only known to occur in marine waters within the Puget basin.

Southern Resident Killer Whale Occurrence in Project Vicinity: The project site is several miles from the Puget Sound. No southern resident killer whales occur within the project action area.

6.8.4 Stellar Sea Lion (*Eumetopias jubatus*)

The Steller sea lion was designated as threatened under the ESA in November of 1990. Critical habitat was also designated for this species in August 1993—primarily in Alaska, but with some

sites in Oregon and California. No critical habitat for Stellar sea lions occurs within Washington State.

Life History: Steller sea lions are large seals; in fact, they are the largest species of eared seal in the world. Steller sea lions are distributed around the northern portion of the Pacific Rim, from northern Japan across the Bering Sea and along the Aleutian chain, to the west coast of Alaska, Canada, and down to California. Although Stellar seals are not known to breed in Puget Sound, the species is considered to occur in Puget Sound waters year-round.

Foraging in Steller sea lions tends to occur relatively close to shore, generally less than 5 miles distant from the coast. The diet of Steller sea lions is varied; these animals are opportunistic and feed on a wide variety of fish and cephalopods. Shoaling fish such as smelt, mackerel, herring, and sand-lance, and numerous species of groundfish form important components of Steller sea lion diets.

Stellar Sea Lion Occurrence in Project Vicinity: The project site is several miles from the Puget Sound. No Steller sea lions occur within the project action area.

6.9 Listed or Candidate Plants

6.9.1 Golden Paintbrush (*Castilleja levisecta*)

Under the ESA, the golden paintbush was listed as threatened throughout its entire range on June 11, 1997. Within Washington State, the species is considered endangered and critically imperiled.

Life History: Golden paintbrush is a perennial herb belonging to the snapdragon family (Scrophulariaceae) that grows to a height of 20-50 cm. The plant is covered with soft, sticky hairs, and has narrow, pointed leaves near the bottom of the plant and broader leaves near the top. C. levisecta flowers from April to June; the flowers are mostly concealed by overlying floral bracts. The floral bracts are yellow to brilliant gold in color, and are a distinguishing feature that sets *C. levisecta* apart from other *Castilleja* species within its range. *C. levisecta* is thought to only reproduce through seed production, rather than vegetative reproduction.

Golden Paintbrush Occurrence in Project Vicinity: The species occurs in sunny, open grassland habitat—often in habitat that experiences low intensity fires on occasion—and has historically been present in prairie habitat and low meadows in the Puget Trough. Habitat destruction, development, and conversion of habitat from prairie to agricultural uses have resulted in significant population declines for *C. levisecta*. Currently, only eight populations are known in Washington State—five on Whidbey Island, two on San Juan Island, and one in Thurston County. The presence of *C. levisecta* at the project site is very unlikely, both due to historical reasons and due to the fact that the available habitat at the project site is not suitable for this species.

6.9.2 Marsh Sandwort (*Arenaria paludicola*)

Marsh sandwort was designated as an endangered species, effective August 3, 1993, over all of its historical range along the west coast of the U.S.

Life History: Marsh sandwort is a slender perennial herb belonging to the pink family (Caryophyllaceae). The stems are flaccid, and surrounding vegetation often supports the plant. The leaves show an opposite arrangement, and are lance-shaped and sharp-pointed. The flowers are small, solitary, and white—blooming between May and August. *A. paludicola* is found in wetland habitat along the Pacific coast, from sea level to about 450 meters. The soils of the plant's habitat tend to be wetlands with standing water or saturated acidic bog soils, with a sandy consistency and high organic content. Historically occurring in wetlands of California, Oregon, and Washington, *A. paludicola* is now only known to occur at two sites in California, and has not been collected in Washington since 1896 (Gamon 1991).

Marsh Sandwort Occurrence in Project Vicinity: In 1990, the Natural Heritage Program found that all but one of the specimens of this plant previously collected in Washington State had been misidentified (Federal Register 1993). Field surveys conducted in 1990 in potential source sites along Washington's coast, as well as in the area where the one historical specimen had been located, resulted in no extant sites containing marsh sandwort. Thus, although the wetland habitat present on the project site might be marginally suitable for this species, the likelihood of this species being present on the project site is very small.

7.0 ANALYSIS OF EFFECTS

The following analyses of effects apply to the list of species potentially occurring within King County and/or within the Puget Sound. Note that the two listed salmonid species of concern (bull trout and Chinook salmon) are analyzed together.

7.1 Bald Eagle

7.1.1 Direct Effects

Potential direct effects due to project-related events are likely to be limited to noise, as the trees to be removed during the project construction are unsuitable as perch or roost trees in their current life-stage. Bald eagles are unlikely to forage in the majority of the project action area which consists of disturbed residential area—eagles tend to forage away from human activity (Watson and Cunningham 1994). However, it is possible that eagles may forage in portions of Magnuson Park. Additionally, much of the action area lacks suitable perch trees and appropriate proximity to water and prey. Noise associated with project construction, however, could potentially affect eagles that might forage in the vicinity of the existing habitat area of the Park. Bald eagles are sensitive to noise and human activity near their nesting sites (Stalmaster and Newman 1978; Stalmaster 1987). However, noise associated with project construction would be temporary, and likely only cause minor impact to any bald eagles within the action area. Temporary displacement of foraging bald eagles away from the vicinity of the project site is unlikely, but is still a possible direct effect of the project.

7.1.2 Indirect Effects

No known perch or roost trees will be removed in the project area, and there appears to be very little potential to indirectly affect bald eagles by eliminating possible perch sites. Project-related habitat degradation or prey base decreases over time are likewise not anticipated, again indicating

that no indirect effects of this nature are expected. Disturbances associated with increased pedestrian or vehicular activity within areas of Magnuson Park where bald eagles are likely to perch or forage are likewise not expected.

7.1.3 Interrelated or Interdependent Effects
No interrelated or interdependent effects to bald eagles are anticipated as a result of this project.

7.1.4 Beneficial Effects
Over time, some beneficial effects to bald eagles may occur as a result of the project. As installed trees in and around the wetland and upland habitat mature, there exists a potential for perch and roosting trees to become available for eagles. Created wetlands, particularly emergent wetland, might provide some foraging opportunity for bald eagles, as well.

7.2 Bull Trout, Chinook Salmon, and Coho Salmon

The effects of the proposed project on the two listed fish species and the candidate fish species within the waters of Lake Washington adjacent to the project site are discussed in detail below. Specifically, potential direct, indirect, and beneficial effects that could affect these species as a result of the project are discussed.

7.2.1 Direct Effects
No direct impacts to bull trout, chinook salmon, or coho salmon are anticipated as a result of this project. No in-water work is purposed and all construction activities will take place outside of the OHWM of Lake Washington and its drainages.

7.2.2 Indirect Effects
No indirect impacts to bull trout, chinook salmon, or coho salmon are anticipated as a result of this project. Project construction will result in no temporary increase in sediment in Lake Washington. Temporary Erosion and Sediment Control (TESC) measures will include Best Management Practices (BMPs) for collecting, treating, and controlling stormwater runoff from the site to prevent untreated stormwater from leaving the construction site.

In addition to construction activities, no water quantity or adverse water quality impacts are anticipated as a result of this project. Water quality leaving the site may well improve over existing conditions as over 12 acres of impervious surfaces will be removed and treatment will be provided to some stormwater runoff which currently discharges untreated into Lake Washington.

Stormwater detention on the site will not be required because the site drains directly to storm drain and surface drainage outfalls in Lake Washington. No new outfalls into the Lake will be created as part of this project. The site will continue to ultimately drain to the existing storm drain and surface drainage outfalls to Lake Washington (Figure 4). Because the quantity of stormwater being discharged from the project area is substantially less than that in Lake Washington, no the effects of this discharge will be negligible on the quantity of water in the Lake.

No project-related water quality impacts associated with the parking lots, or roadways are expected in Lake Washington or drainages to Lake Washington. Although stormwater quality treatment will

not be required for this project there will still be a reduction in over 12 acres of impervious surface area, and stormwater treatment will be provided for some existing roads and parking lots as shown on the site grading and site drainage and utilities plans. Stormwater quality treatment measures may include catch basins and/or vaults, ecology embankments and/or ditches, biofiltration swales, and filter strips. These facilities will ensure that water is treated prior to discharge into the wetland system and eventually discharged to Lake Washington. This condition represents an improvement over existing conditions under which water is not treated before being discharged to the lake.

In addition to potential impacts from impervious surfaces, the potential impacts to water quality from runoff associated with the playing fields were also examined. No project-related water quality impacts associated with the playing fields are expected in Lake Washington or drainages to Lake Washington.

Artificial turf fields use a type of rubber for the infill, in combination with fibers (polyethylene, polypropylene, nylon, etc.) to help hold the infill in place. Often, the infill rubber is derived from recycled material, including vehicle tires and athletic shoes. The rubber is referred to as 'cryogenic rubber', as the rubber is first frozen and then broken into spherical pieces, removing any sharp edges in the process.

Concerns regarding potential leaching of infill into water percolating through such material have been raised in the past, and studies have concluded that leaching of pollutants does not occur, or occurs at negligible levels (i.e. well below background pollutant levels). No known water quality issues are associated with water moving over the inert fibers of athletic fields. Liu et al (1998) presents a review of studies conducted to assess the potential for leaching of metal and organic pollutants into water moving through rubber fill associated with a variety of different civil engineering projects. Generally, all of the pollutants of concern occurred at levels below drinking water regulatory standards as water moved through the rubber fill. Although instances of pollutant loading were seen, these all occurred under conditions of extreme pH levels (metals leached under very acidic conditions, organics leached under very basic conditions). Water at the Magnuson site will not exhibit extreme pH levels, and no leaching of pollutants into water percolating through the athletic fields is anticipated. According to King County, industrial-grade glue is used to seams in synthetic fields; no known environmental impacts are associated with the use of glue in synthetic athletic fields.

Another study of artificial turf was conducted in February of 2003 by Talasaea Consultants (2003). They examined runoff from two ball fields in Redmond, Washington. Ecology water quality Standards and the EPA Freshwater acute criteria standards were used to determine toxicity. All water samples collected during this study were identified as non-toxic to aquatic organisms. Specifically, no metals toxicity was detected in any sample collected from either field.

7.2.3 Interrelated and Interdependent Effects

No interrelated or interdependent effects to bull trout or Chinook salmon are anticipated as a result of this project.

7.2.4 Beneficial Effects

The project includes measures for collecting and treating stormwater from the project area. The collection and treatment of stormwater will have beneficial effects for fish in Lake Washington, including coho and chinook salmon and bull trout. Currently no detention or treatment is provided for runoff from the existing site. The new treatment facilities will provide treatment of 100% of the stormwater draining the pollution-generating impervious surfaces. This will reduce the amount of chemical contamination to Lake Washington and improve habitat quality for fish.

7.3 Proposed Critical Habitat for Bull Trout

Critical habitat proposed for the Coastal/Puget Sound ESU bull trout populations lies outside of the project's action area for aquatic species. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects of this project to proposed critical habitat for bull trout is expected.

7.4 Listed or Candidate Bird Species (other than bald eagles)

The habitat within the project action area for terrestrial wildlife is unsuitable for marbled murrelets, Northern spotted owls, and yellow-billed cuckoos. Northern spotted owls are associated with old growth forest for nesting purposes, as are marbled murrelets. Marbled murrelets also forage in marine waters, and the closest marine waters (Puget Sound) are well outside of the project action area. Yellow-billed cuckoos require large tracts of riparian scrub-shrub vegetation for nesting purposes, and non-breeding yellow-billed cuckoos are exceedingly unlikely to occur within the project action area. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects to these bird species are expected from this project.

No designated critical habitat for marbled murrelets or Northern spotted owls occurs within the project action area. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects to designated critical habitat for these bird species are expected from this project.

7.5 Listed or Candidate Carnivorous Mammals

The four species of listed or candidate carnivorous mammals—Canada lynxes, gray wolves, grizzly bears, and Pacific fishers—show specific habitat associations. These habitat associations involve relatively remote, forested conditions at some remove from human disturbances. No such habitat occurs within the project action area, and these species will not be present within the action area. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects to these carnivorous mammal species are expected from this project.

7.6 Listed or Candidate Marine Species

The four species of listed marine animals—humpback whales, leatherback sea turtles, southern resident killer whales, and Steller sea lions—do not occur within the project action area. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects to these marine species are expected from this project.

7.7 Listed or Candidate Plant Species

Neither listed plant species is expected to occur within the project vicinity. No suitable habitat exists on site for golden paintbrush—a species that favors open, prairie conditions that are periodically exposed to low intensity fires. Marsh sandwort occurs in wetlands, particularly bog wetlands, but no indications exist that this species remains in Washington State, despite intensive sampling efforts. It is extremely unlikely that marsh sandwort occurs on the project site. Therefore, no direct, indirect, interrelated, interdependent, or beneficial effects to these plant species are expected from this project.

8.0 RECCOMMENDED CONSERVATION MEASURES

Although construction of the athletic fields will affect existing wetlands, there will be an overall beneficial impact to upland and wetland habitats in Magnuson Park due to the creation of new wetlands and enhancement of existing wetland and upland habitat.

8.1 Measures to Avoid Impact

Efforts to avoid wetland impacts involved modifying design features of the Phase 2 development based on the proximity of wetlands. Efforts to avoid wetland impacts involved concentrating the athletic fields on higher ground within the western half of the site, while improving wetland and upland habitat on the lowest ground within the eastern half of the site. Wherever possible, the athletic fields and new trails were placed on existing upland areas and impacts to forested wetlands were avoided. The stormwater conveyance facilities were designed to provide wetland functions and create aquatic habitat.

Lighting considerations included consideration of glare, spill light, and sky glow and their impact on neighboring communities, on site low income housing (LIHI) and on the habitat zones. In phase 2 detailed field layout assessments were conducted to identify opportunities for modifying layout and/or design details to avoid wetland impacts identified in the delineation and minimize impacts to significant trees or stands of trees, where possible. As examples, the rugby field was shifted to minimize loss of existing trees, and both fields 9 and 6 were modified to minimize direct impacts to wetlands and allow creation of the proposed entry wetland chain. (Field 9 was rotated and shifted to the north and field #6 was shifted north). The full master plan was also modified, shifting future improvements (if ever pursued) to avoid impacts to wetlands and allow creation of the proposed entry wetland chain in this phase. Areas of fill were reduced by the use of small retaining walls, where possible, to reduce the loss of wetlands (e.g., SE corner of Field 6).

Design for enhancing existing wetlands or creating new wetlands in close proximity to existing wetlands considered the impacts of dewatering wetlands by excavating too close to them or reducing the estimating contributing areas for surface runoff. In the SE corner of the project area, for example, the created wetland was reconfigured from early concepts, to avoid stands of black cottonwood samplings in the existing wetland that would have been dewatered with the initial design ideas. Fields, trails, site grading for water movement and wetland creation/enhancement

were all designed, where possible to avoid and minimize adverse impacts on existing wetlands. The resulting configuration does result in wetland fill which is described below.

8.2 Measures to Minimize Impact

Potential impacts to existing wetlands will be minimized during construction of the athletic fields by using Best Management Practices (BMP) and following Temporary Erosion and Sediment Control (TESC) measures. The following BMP and TESC measures will be implemented during construction to prevent impacts to wetlands within the project area.

- Prior to construction the limits of clearing will be marked and erosion control devices (construction exits, silt fencing, sediment barriers, straw bales, and/or sediment traps and ponds, etc.) will be placed to prevent runoff of sediment-laden waters into the wetlands.

- Construction access roads from the site will be constructed using quarry spalls overlying geotextile fabric to prevent movement of sediment from vehicle tires onto adjacent site features and/or roadways.

- Stockpiles will be covered with impervious materials when left unattended or during rain events. Construction staging will be located on existing paved surfaces, away from existing wetlands.

- Wash-water associated with construction will be contained to prevent runoff into adjacent wetlands.

- Refueling operations will be conducted distant from the wetlands, and a spill prevention and control plan will be prepared and implemented by the contractor to avoid accidental spills.

- Exposed soils that are graded to permanent conditions and will not be disturbed again will be stabilized by hydroseeding. Cleared areas will be revegetated with native species in accordance with the Vegetation Management Plan (Sheldon & Associates 2001).

8.3 Measures to Compensate for Impacts

Within the remaining Phase 2 area, several existing wetland habitats will be enhanced and wetlands will be created. Approximately 4 acres of wetland habitat will be enhanced by changing hydroperiods, invasive species removal, and supplemental planting of native species to increase species richness and physical complexity. Approximately 10.05-acres of wetland habitat will be created including open water, aquatic bed, emergent, scrub/shrub, and forested wetland types. The proposed compensation plan is described fully in the *Wetland Compensation Plan for Magnuson Park Phase 2* (Sheldon & Associates 2006).

Compensation actions will include enhancement of existing wetlands or portions there-of through changes in hydroperiods and/or increased species richness. Some existing wetlands are proposed

to have a change in hydroperiod to increase the depth and/or duration of saturation/inundation within the wetland with the result of increasing plant richness and improving a suite of functions. Change in hydroperiods may be caused by changes to the outlets (e.g., berms, restricting outlets, backwatering, etc.) or change in wetland configuration through grading. Compensation actions will include creation of wetland in areas where no wetlands currently are present. Also, some wetland habitat will be re-established in the area of Mud Lake, the historic peat-based wetland that was present on the site after lowering of Lake Washington (1916), and before construction of the Naval Air Station in the 1930's. An individual wetland may have portions of it that are proposed to be enhanced, and portions that will be incorporated into larger created wetlands or systems; the two compensation actions (enhancement/creation) are described below.

8.3.1 Wetland Enhancement

In Phase 2 several types of enhancement actions are proposed for a variety of wetlands (not all actions will occur in all wetlands):

- changes in hydroperiod,
- increases in native plant richness,
- increase in complexity of vegetation types and physical structure,
- increase in upland forest habitat within immediately adjacent buffer areas
- increased connectivity between wetland community types
- decrease in fragmentation of habitat caused by trails, human activities and dogs

Many of the wetlands to be enhanced will have a change in their hydroperiod generally through one of two means. Either the outlet configuration will be modified to impound water to deeper depths and for longer duration in the spring, or an area may be graded to lower the bottom contours and thereby result in a changed hydroperiod. Only the Promontory Ponds are dredged to expose groundwater; the other proposed grading actions in wetlands are generally driven by site topography and the need to create conditions where water will continue to flow passively through the site and eventually into Lake Washington.

Excavation for either enhancement or creation purposes is generally proposed to be less than 3 feet in depth, with the exception of the excavation for Promontory Point ponds. It is proposed to over-excavate zones of grading where planting is proposed, and mix into the sub-soil, by ripping, a minimum of 10-12 inches of peat. The City salvaged and stockpiled approximately 10,000 cubic yards of peat and organic soils from the Ravenna Creek daylighting project starting in the late summer of 2005. The sole use of that peat was for use on this site to provide an appropriate source of organic material for the areas of enhanced or created wetland. Grades indicated on the grading plans and planting plans are all *final grades*, not the over-excavated grades.

For enhancement or creation actions, it is proposed to use native species of trees, shrubs, and herbaceous plants. It is proposed to use certain shrubs and trees in early seral stage plantings, and re-plant or under-plant trees and shrubs when portions of the site have reached appropriate shade conditions. Under-planting will be done in locations where thickets of existing plants make under-planting appropriate. Table 3 provides a summary of the acreages of enhancement.

Table 3. Acreage of Enhancement in Magnuson Park Phase 2 Area

Wetland	Enhancement	
	Square foot	Acres
B1	21,744	0.50
B4	10,686	0.25
E1	50,560	1.16
E2	11,591	0.27
M1	14,336	0.33
M2	13,469	0.31
M5	14,744	0.34
M6	34,678	0.80
Total	174,753	4.01

8.3.2 Wetland Creation

In Phase 2 there are several actions proposed to create wetlands where none currently exist:

- Dredging to create elevations that create wetland hydroperiod,
- Back-watering of upland areas to create wetland hydroperiods;
- Grading the site and directing surface flows to create long-term inundation;
- Creating area of inundation for sufficient duration that capillary fringe action will create wetland conditions in soils that are graded to create inundation

The Promontory Ponds are proposed to be dredged to depths over 6 feet in the area of the former Mud Lake to expose groundwater. This action could be called re-establishment, however the historic actions are from such a long time ago and landscape processes (the Chittendon locks and lowering of Lake Washington) have been so altered that it is not appropriate to project that historic conditions can or will be re-established on the site. Table 4 provides a summary of the acreages of creation.

Table 4. Acreage of Creation in Magnuson Park Phase 2 Area

Area	Creation	
	Square foot	Acres
Polygon B	47,977	1.10
	43,064	0.99
Polygon E	9,191	0.21
	2,247	0.05
Polygon M	13,469	0.31
	294,576	6.76
	15,930	0.37
	11,129	0.26
Total	437,583	10.05

8.4 Monitoring

A monitoring plan will be prepared and implemented annually to evaluate the success of the habitat area. The monitoring program uses the principles of adaptive management to guide monitoring activities. Adaptive management is a process with two key components (Elzinga et al. 1998). One component is that monitoring should only be initiated if opportunities for management change exist. The second component is that monitoring is driven by objectives and the monitoring activities must be designed to determine if the objectives have been achieved. Valid monitoring data is critical to making meaningful management decisions that help the site meet its objectives. Monitoring plans are based on site conditions and plant community development. These factors, in addition to specific mitigation objectives, are incorporated into a site-specific monitoring plan at the beginning of each monitoring season.

Quantifiable criteria presented as performance standards will be used as the basis for monitoring the success of the mitigation site. Monitoring protocols for the project are described in detail in the Wetland Compensation Plan for Magnuson Park that will be provided to accompany this document.

9.0 CONCLUSIONS AND EFFECT DETERMINATION

9.1 Bald Eagle

The proposed project is not likely to result in any substantial direct or indirect impacts to bald eagles. The action area and project vicinity are not considered breeding habitat for bald eagles. Any direct impacts to foraging or wintering bald eagles are likely to be minor and temporary, and would involve avoidance of the project site during construction periods generating loud noise. The project-related loss of some trees is unlikely to limit the availability of perching sites for foraging, due to the low quality of these trees as perch trees. No other impacts to bald eagles are anticipated as a result of this project. Some benefit to bald eagles, in the form of increased perching or roosting trees, could potentially occur as wetland and upland habitat matures. Due to the minor and temporary nature of any disturbance to bald eagles, this project **may affect, but is not likely to adversely affect** this species.

9.2 Bull Trout, Chinook Salmon, and Coho Salmon

No effects determination for coho salmon is necessary unless this species becomes listed. However, in the event of listing, an effect has been assessed for Puget Sound coho salmon. The project-related conditions that are likely to affect coho salmon are similar to those that are likely to affect Chinook salmon in the Swamp Creek system. Therefore, a similar determination that this project **may affect, but is not likely to adversely affect** Puget Sound coho pertains.

9.3 Listed or Candidate Bird Species (other than bald eagles)

9.3.1 Marbled Murrelet

Due to the extreme unlikelihood of this species occurring in the project action area, this project will have **no effect** on marbled murrelets.

Due to the lack of designated critical habitat within the project action area, this project will have **no effect** on designated critical habitat for marbled murrelets.

9.3.2 Northern Spotted Owl

Due to the extreme unlikelihood of this species occurring in the project action area, this project will have **no effect** on Northern spotted owls.

Due to the lack of designated critical habitat within the project action area, this project will have **no effect** on designated critical habitat for northern spotted owls.

9.3.3 Yellow-billed Cuckoo

No effects determination is necessary unless this species becomes listed. However, in the event of listing, an effect has been assessed for western yellow-billed cuckoos. Due to the inappropriateness of the on-site habitat for this species, and the extreme unlikelihood of this species occurring in or utilizing the project action area, this project should have **no effect** on this species.

9.4 Listed or Candidate Carnivorous Mammals

9.4.1 Canada Lynx

Due to the extreme unlikelihood of this species occurring in the project action area, this project will have **no effect** on Canada lynx.

9.4.2 Gray Wolf

Due to the extreme unlikelihood of this species occurring in the project action area, this project will have **no effect** on gray wolves.

9.4.3 Grizzly Bear

Due to the extreme unlikelihood of this species occurring in the project action area, this project will have **no effect** on grizzly bears.

9.4.4 Pacific Fisher

Due to the lack of appropriate habitat for this species in the project action area, and the pronounced rarity of this species in Washington State, it is extremely unlikely that Pacific fishers occur within the project action area. Therefore, this project will have **no effect** on Pacific fishers.

9.5 Listed or Candidate Marine Species

9.5.1 Humpback Whale

This species does not occur within the project action area. Therefore, this project will have **no effect** on humpback whales.

9.5.2 Leatherback Sea Turtle
This species does not occur within the project action area. Therefore, this project will have **no effect** on leatherback sea turtles.

9.5.3 Southern Resident Killer Whale
This species does not occur within the project action area. Therefore, this project will have **no effect** on southern resident killer whales.

9.5.4 Steller Sea Lion
This species does not occur within the project action area. Therefore, this project will have **no effect** on Steller sea lions.

9.6 Listed or Candidate Plant Species

9.6.1 Golden Paintbrush
Due to the lack of appropriate habitat for this plant species, and the high degree of unlikelihood of golden paintbrush occurring in the project action area, this project will have **no effect** on golden paintbrush.

9.6.2 Marsh Sandwort
Due to the inappropriate habitat in the project vicinity and extreme rarity of this plant, it is highly unlikely that marsh sandwort occurs in the project area. Thus, this project will have **no effect** on marsh sandwort.

10.0 ESSENTIAL FISH HABITAT ASSESSMENT

The Magnuson-Stevens Fishery Conservation and Management Act requires that essential fish habitat (EFH) must be identified by NOAA for federally managed marine fish. In addition, federal agencies must consult with NOAA on all proposed actions undertaken or funded by the agency that may affect EFH. The Pacific Fisheries Management Council (PFMC) has designated EFH for the Pacific salmon fishery, for federally managed groundfish, and for coastal pelagic fisheries.

For the Magnuson Park Phase 2 project, only species of the Pacific salmon fishery could potentially be affected, as nearby Lake Washington is a freshwater system. The EFH designation for the Pacific salmon fishery includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by PFMC. The Pacific salmon management unit includes Chinook, coho, and pink salmon (*Oncorhynchus gorbushcha*).

Within the vicinity of the project area, but outside of the action area for the project, EFH occurs for Puget Sound Chinook and coho salmon. These species are known to occur in the waters of Lake Washington, as both adults and juveniles. Chinook and coho are known to use Lake Washington for adult migration, juvenile out-migration, and rearing where suitable habitat is present. The project is expected to result in no increase in suspended sediment in Lake Washington during construction, and no decrease in the water quality of any discharge into Lake Washington. In fact,

habitat and water quality is expected to improve in the vicinity of the project as a result of wetland creation and enhancement, and the addition of water treatment to water discharged into Lake Washington. No permanent adverse effects on EFH for Pacific salmon will occur as a result of this project. Therefore, the project will have **no effect** on EFH for Pacific salmon.

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APPENDIX A
AGENCY LETTERS ON TES SPECIES

APPENDIX B
CONSTRUCTION DRAWINGS

APPENDIX C
SITE PHOTOS